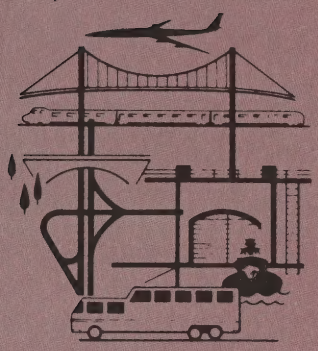
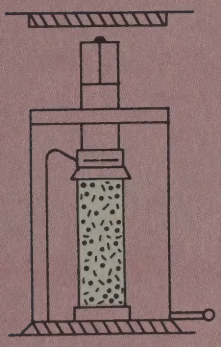
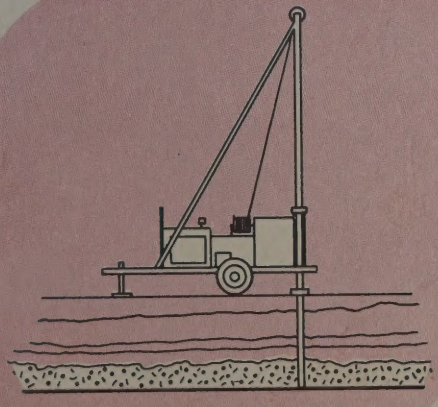
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION

RAYMOND T. SCHULER, COMMISSIONER

SOIL MECHANICS
BUREAU







CAYUGA LAKE BASIN

SIXMILE CREEK DAMSITES

GEOTECHNICAL STUDY
FOR FEASIBILITY EVALUATION

PIN E103-00-701.02

JUNE 1973

SM 238b (1/73)

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
Raymond T. Schuler, Commissioner

1220 Washington Avenue, State Campus, Albany, New York 12226

July 9, 1973

Mr. John A. Finck
Director of Water Resources Planning
New York State Department of
Environmental Conservation
50 Wolf Road
Albany, New York 12205

Dear Mr. Finck:

Subject: Cayuga Lake Basin
Sixmile Creek Damsites
Tompkins County
P.I.N. E103-00-701.02

In accordance with your request of August 25, 1971 to Mr. B. A. Lefeve, we are transmitting to you the attached report, "Cayuga Lake Basin, Sixmile Creek Damsites, Geotechnical Study for Feasibility Evaluation".

In preparing our report, we were aided by information supplied by members of your staff and by subsurface exploration work performed by our Regional Soils Section. This study and report was prepared by Mr.Austars R. Schnore, Senior Soils Engineer.

Our study of the site conditions indicates that the construction of a dam is technically feasible at both the Bethel Grove Site and the Alternate Site. A very important design-related consideration in determining whether or not to carry out the proposed project is the hazard of the proposed sites -- the fact that they are located only about two miles upstream of a densely populated section of the city of Ithaca. It is true that a chain of reservoirs exists on Sixmile Creek at present. However, the proposed dam, at either site, would increase the quantity of impounded water some ten times. The location of the dam dictates that every possible precaution be taken in the design and the construction of the project to insure that the possibility of a failure is reduced to the absolute minimum.

The findings of our investigation are detailed in the report. The main points can be summarized as follows:

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1. The foundation conditions at either site were found to be far from optimum. This problem, in conjunction with the hazard of the site, may diminish the desirability of constructing a dam in this area.

2. Because of the complexity of the sites, a very thorough foundation exploration program will have to be undertaken in the final design phase.

3. Special treatment of various types will be required to insure the safety of the proposed dam. This treatment will significantly increase the cost of the project. Anticipated methods of treatment are described in our report to aid you in evaluating the feasibility of the project.

We will be pleased to meet with you to discuss this report in greater detail.

Very truly yours,

Lyndon H. Moore, Director
Soil Mechanics Bureau

By

Bernard E. Butler

Bernard E. Butler
Associate Soils Engineer

BEB:ARS:MVM

Attachment

CAYUGA LAKE BASIN

SIXMILE CREEK DAMSITES

GEOTECHNICAL STUDY
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JUNE 1973

NEW YORK STATE DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
ALBANY, N.Y. 12226

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1. INTRODUCTION

1.1 Authorization

This report has been prepared in accordance with a request from Mr. John A. Finck, Director of Water Resources Planning, Department of Environmental Conservation, to Mr. Bernard A. Lefeve, then Chief Engineer, Department of Transportation, dated August 25, 1971. Mr. Lefeve authorized the Soil Mechanics Bureau to proceed with this work on August 30, 1971.

Mr. Finck's request was for foundation information sufficient to permit an evaluation of the feasibility of this project. The project would ultimately consist of a dam, in excess of 120 feet high, constructed at one of two alternate locations that are under consideration. The dam at either site would retain a reservoir extending upstream for a distance of two miles.

For a project of this type the requested information goes far beyond a compilation of boring logs and laboratory descriptions of soil and rock samples. Accordingly, we have prepared this report, which describes the effect of the topographical and geological features and of the conditions disclosed by the subsurface explorations on the design and thereby on the feasibility of the project.

1.2 Scope of Report

The intent of our study and this report was to obtain and present information necessary to establish the feasibility of this project. For this purpose, the topography and geology of the entire area and each alternate proposed damsite was reviewed. The limited number of subsurface explorations made were used to define the general location and character of the dominant subsurface strata. A much more comprehensive exploration program will be required if and when it is decided to proceed further with the design of this project.

On the basis of an evaluation of the information that was obtained, methods of treatment that would be required to achieve an adequate design were selected. These are presented in this report in order to enable you to perform a more valid economic analysis and comparison. The final treatment may be different as additional subsurface information becomes available in the design stage.

Our basic study was made assuming earth dams at both sites, as originally proposed. However, considerations are also presented for the concrete dam scheme later proposed for the Alternate Site.

1.3 Information Utilized in Study

Our study was based on the following information:

1. The proposed layout at the two sites, plotted on prints made from a USGS map and received from your office with a memorandum dated September 14, 1973.

2. A 1:24,000 scale USGS map of Ithaca East quadrangle.

3. Aerial photographs of the area.

4. A United States Department of Agriculture soil survey report for Tompkins County.

5. Field inspections of the two sites by representatives of this Bureau.

6. Various sources describing the geology of this area.

7. A description of the foundation conditions at the two sites, as interpreted from surface observations and previous subsurface explorations, transmitted to us by Mr. K. Davis of your office, August 26, 1971.

8. Subsurface exploration logs from six borings, numbered B-1, and B-3 through B-7 at the Bethel Grove Site and from 7 borings, numbered A-1 through A-4, A-6, A-9, and A-9A at the Alternate Site. These borings were made by personnel of the Department of Transportation Region 3 Soils Section in 1971 and 1972. In general, 2½-inch casing was used in the overburden. However, 4-inch casing was used in borings A-9, A-9A, B-3, B-4, B-5, and B-6. Copies of the logs have been transmitted to you previously and are also included in the Appendix to this report.

9. A visual examination and classification of soil samples from these borings in our laboratory. Moisture contents of plastic soils were determined concurrently.

10. Seismic determinations of the elevation of the bedrock surface at 28 points by this Bureau.

11. A terrain reconnaissance review by personnel of this Bureau.

2.1 Topography

2.1.1 General

The two proposed damsites are located on Sixmile Creek about two miles southeast of the city of Ithaca (See Drawing No. 3SM 1819A). A number of smaller reservoirs have been constructed in the past on Sixmile Creek in the area under study and downstream. The sides of the valley, to a height of 100 to 200 feet above the floor of the Sixmile Creek valley, are considerably steeper than the hillsides forming the general relief of the area. Numerous small streams, draining into Sixmile Creek from the southwest, have carved deep V-shaped gullies. Traces of old and not-so-old landslides are visible on the side slopes of the valley.

2.1.2 Bethel Grove Site

The proposed Bethel Grove Site is located at the upstream end of the existing Ithaca Reservoir. The existing reservoir has a normal pool elevation of 704. The valley here has a flat bottom, about 1000 feet wide. The side slopes are moderate (typically inclined at 1 vertical on 3 horizontal). Two streams draining into Sixmile Creek from the left (looking downstream) form a narrow, steep-sided ridge, across which it is proposed to construct the spillway. Accessibility to the site is good, except in the gully that is the proposed location of the spillway outlet channel.

2.1.3 Alternate Site

The so-called Alternate Site is one half of a mile downstream of the Bethel Grove Site, at the opposite end of Ithaca Reservoir. Here Sixmile Creek flows in a narrow, steep-sided gorge. A small tributary has cut a gully, about 100 feet deep, separating a knob from the southwest wall of the valley. The axis of the proposed dam crosses the steep-sided Sixmile Creek valley, the tributary gully, and the intervening knob. Evidence of numerous landslides, some quite recent, is visible in the gully and on the steep southwest bank of Sixmile Creek.

2.2 Geology

The bedrock in this area belongs to the Genesee group, which consists of alternating, nearly horizontal beds of shale, siltstone and sandstone. During the last ice age, the glacier moving southeast along the axis of the Sixmile Creek Valley scoured and deepened the pre-existing valley and deposited a mantle of till over the bedrock. As the glacier melted, a lake was formed in the valley between the retreating ice front and the divide to the south of White Church. Lake sediments consisting of silts and clays were deposited in the lake. Delta deposits of sand were formed where streams flowed into the glacial lake.

After retreat of the glacier, the lake drained. The post-glacial streams eroded their channels down through the glacial sediments, depositing, in turn, loose alluvium. As stream erosion progressively steepened the slopes, the lake sediments were subject to landslides, a process still taking place.

Sixmile Creek became trapped in the side of the older rock valley at the Alternate Site during the process of re-cutting the valley down through the glacial sediments. Once entrapped in the rock, the creek was no longer free to meander in this section but occupied itself with downcutting along its joint-controlled course.

2.3 Proposed Facilities

As part of this project, it is proposed to impound a reservoir for the purpose of water supply, water quality control, and recreation.

The controlling elevations at the two sites under consideration, as indicated by your office, are as follows:

	Bethel Grove Site	Alternate Site
Elevation of crest of dam	823	808
Normal pool elevation	800	785

Earth dams were proposed originally, with combined service and emergency spillways located in the left and the right abutment at the Bethel Grove and Alternate Sites, respectively. A later scheme proposed a concrete dam with a central overflow section for the Alternate Site.

2.4 Subsurface Conditions

2.4.1 Bethel Grove Site

The locations of borings and seismic determinations made at the Bethel Grove Site are shown in Drawing No. 3SM 1819B. This drawing is an enlargement of a portion of a 1:24,000 scale USGS map and, as such, is considered to be of sufficient accuracy for preliminary purposes only.

Subsurface profiles along lines A-A and B-B are also shown in Drawing No. 3SM 1819B. The number of explorations was not sufficient to determine definite limits of strata. Probable boundaries between different soil deposits have been denoted on the profiles by solid lines. Possible boundaries are indicated by dashed lines.

The uppermost soil stratum found in the borings progressed at the abutments of the proposed dam consists of glacial lake deposits -- layered silts and clays -- stiff in the upper 20 feet but becoming softer at greater depths. Boring B-7, in the right abutment, encountered soft to firm silts and clays to a depth of 81 feet (Elev. 744). In boring B-4, at the left abutment, these materials extend to a depth of 45 feet (Elev. 778). These silts and clays must be assumed to have a low shearing strength and to be quite compressible. The upper brown "crust" of this material will be suitable for embankment construction. However, the lower gray material, because of its high moisture content, should be considered as unsuitable for utilization in the embankment.

Pervious mixtures of compact gravel, some sand, a trace of silt, and containing boulders (probably glacial outwash) were found in the upper 40 feet of boring B-5, on the lower slopes of the left abutment. Below these depths, the above borings encountered very compact bouldery glacial till.

Two borings, B-1 and B-3, were made near the location of the proposed spillway. The soils encountered in these borings were primarily silts with minor admixtures of fine sand, clay, and shale fragments. In boring B-1 (surface elevation 861.8) this material is comparatively loose near the surface, becoming compact only at a depth of 40 feet. In boring B-3 (surface elevation 735.9) this material is extremely compact from the ground surface to a depth of 28 feet where bedrock was encountered.

The bedrock at the site consists of nearly horizontally bedded shale. Only three of the borings (B-3, B-5, and B-6) made along the alignment of the proposed dam were progressed to bedrock. Additional information regarding the depth to bedrock can be obtained from seismic data. The bedrock elevation at each seismic point is listed in a tabulation of seismic data included in this report. The combined boring and seismic data indicate that bedrock is between Elev. 710 and 740 at the right abutment. In the stream valley it is near Elev. 700 or just below ground surface, dipping down to below Elev. 630 at drill hole B-5. In the area of the spillway channel the bedrock surface is near Elev. 700.

Groundwater was observed only in borings B-3, B-5 and B-6, at depths of 2, 4, and 1 feet, respectively. The position of the groundwater level at borings B-4 and B-7 can be inferred from the location of the boundary between the brown and the gray silts and clays. In both of these borings this boundary is at a depth of approximately 15 feet.

2.4.2 Alternate Site

The locations of borings and seismic determinations for the Alternate Site are shown in Drawing No. 3SM 1819C, which is an enlargement of a USGS map and is sufficiently accurate only for a preliminary study.

A subsurface profile along the proposed axis of the dam is also shown in Drawing No. 3SM 1819C. Again, because of the limited number of explorations, the boundaries of the various soil deposits cannot be determined reliably at this time.

Alluvium, consisting of mixtures of sand, gravel, and silt, with traces of organic material was found to depths of about 20 feet in boring A-2 and 8 feet in boring A-6. Otherwise, the predominant surface soils are soft to firm layered silts and clays (glacial lake deposits). These silts and clays were found in boring A-2 between depths of 20 and 63 feet, in boring A-3 to a depth of 52 feet, and in boring A-4 to a depth of about 30 feet. This soil must be assumed to have a low shearing strength and to be highly compressible. The upper brown silts and clays, found in the borings generally to a depth of 20 feet below ground surface, are suitable for embankment construction. The underlying gray silts and clays, because of their high moisture content and low rate of drying, cannot be counted on to provide satisfactory embankment material.

N.Y.S. DOT
Soil Mechanics Bureau
June 13, 1973

Cayuga Lake Basin
Six-mile Creek Damsites
Seismic Data

Seismic Point	Baseline Station	Offset	Ground Elev.	Seismic Depth	Bedrock Elev.
SP-1	31+51	1395' Rt.	828.1	116'	712.1
SP-2	35+25	1078' Rt.	831.9	95'	736.9
SP-2A	33+77	1210' Rt.	830.4	>70'	<760.4
SP-2B	32+15	1330' Rt.	829.0	106'	723.0
SP-3	"A" 16+40	0'	824.9	97'	727.9
SP-4	33+90	783' Rt.	827.9	71'	756.9
SP-5	"C" 3+40	55' Rt.	839.3	118'	721.3
SP-5A	"C" 2+10	40' Rt.	846.1	>100'	<746.1
SP-6	"C" 0+65	20' Rt.	852.3	>100'	<752.3
SP-7	"B" 4+80	10' Lt.	721.1	76'	645.1
SP-8	76+28	590' Rt.	718.1	70'	648.1
SP-9	153+75	32' Rt.	779.2	140'	639.2
SP-10	157+55	40' Rt.	779.2	>100'	<679.2
SP-11	153+85	10' Rt.	808.8	177'	631.8
SP-12	148+75	70' Rt.	809.1	>100'	<709.1
SP-13	147+92	400' Lt.	809.1	137'	672.1
SP-14	144+75	20' Lt.	809.1	91'	718.1
SP-15	153+48	210' Lt.	809.1	205'	604.1
SP-16	87+30	87' Lt.	856.8	145'	711.8
SP-17	93+65	35' Lt.	891.6	135'	756.6
SP-18	161+70	15' Rt.	724.1	16'	708.1
SP-19	159+95	110' Lt.	724.0	15'	709.0
SP-20	5+50	225' Rt.	826.7	44'	782.7
SP-21	5+85	437' Rt.	807.3	50'	757.3
SP-22	5+15	35' Rt.	849.7	41'	808.7
SP-24	6+48	818' Rt.	779.7	33'	746.7
SP-25	175+22	415' Lt.	826.5	26'	800.5
SP-26	172+38	497' Lt.	802.8	44'	758.8

The compressible lake sediments in borings A-2, A-3, A-4, and A-6 are underlain by very compact glacial till (boulders, gravel, sand and silt). Borings A-2 and A-3 were terminated in the glacial till, 150 feet below ground surface. Borings A-2 and A-6 in the right abutment, however, encountered bedrock at depths of 37 feet and 45 feet, respectively.

Borings A-9 and A-9A were drilled on the lower slopes of the right abutment, where Sixmile Creek has removed the overburden, and bedrock outcrops on the surface. Boring A-9 was drilled vertical while A-9A was drilled adjacent to A-9 at a 45° angle into the rock slope.

As shown on Drawing No. 3SM 1819C, the surface of the bedrock dips gently from about Elev. 780 at the spillway location, outcropping at about Elev. 750 on the north slope of the Sixmile Creek gorge. From there the rate of dip appears to increase, so that boring A-3 was progressed to Elev. 640 without encountering bedrock. Seismic points in this area indicated bedrock to occur between Elev. 600 and 640. In the area of the gully at the south end of the dam, the bedrock surface rises again, to Elev. 672 at seismic point SP-13 and Elev. 718 at seismic point SP-14.

Boring A-1, on the left bank of the gully eroded by the small tributary stream, disclosed a soil profile entirely different from that found in the other borings. The surface soil to a depth of 38 feet is a medium compact to very compact material composed mainly of silt with lesser quantities of fine sand and clay and shale fragments. A very pervious uniform sand, possibly a delta deposit, was found between depths of 38 and 75 feet. The boring was stopped at a depth of 75.7 feet in very compact sand, gravel, and silt, possibly the very compact bouldery glacial till found in other borings at this site.

Groundwater was observed only in borings A-1 and A-2, at depths of 10 and 30 feet, respectively. However, based on the change in the color of the silt and clay deposit, in our opinion the static groundwater level at borings A-2, A-3, and A-4 is at a depth of approximately 20 feet.

3. EFFECTS OF SITE CONDITIONS ON PROJECT

3.1 Downstream Hazard

Two miles downstream from the proposed project sites, Sixmile Creek leaves a narrow gorge to flow between a hillside and a flat alluvial fan, occupied by a relatively densely populated area of the city of Ithaca. Because of this fact, greater care than usual must be taken in foundation investigations, and the design and construction of the project.

3.2 Stability of Reservoir Shoreline

The fine-grained glacial lake deposits that are present on the sides of the creek valley have a low shearing strength and are subject to sliding on even moderate slopes. Traces of old and recent landslides can be seen throughout this area. Eventually all clay slopes subject to seepage tend to assume an angle of about 10 degrees. This is an extremely slow process however, frequently requiring many hundreds of years.

The frequency of slope failures will be increased only slightly by the newly impounded reservoir. The adverse effects on the stability of the slopes resulting from wave action and buoyancy at the bottom of the slope will be counteracted to some extent by the reduction of the hydraulic gradient in the slope.

The potential amount of material that could slide into the reservoir will be very small in comparison with the volume of the reservoir. The reduction in reservoir capacity from this source, or the sudden rise in reservoir water level as a result of a slide, is considered to be insignificant. Some muddying of reservoir waters will occur, but it is expected to be minor when compared to that which could result from any extensive grading of the shoreline.

Slide material should not be permitted to block the outlet works or the spillway. This should be taken into account in locating these facilities and in designing slopes in their vicinity.

In summary, it is not considered to be practical or necessary to flatten all silt and clay slopes around the periphery of the reservoir to an ultimately stable slope.

3.3 Bethel Grove Site

3.3.1 Removal of Low-Strength Soils

Soft to firm silts and clays make up the surface soils at both abutments of the proposed dam. Because of their assumed low strength, these materials will most likely have to be removed under parts of the dam to insure its stability. The anticipated extent of excavation that will be required in these soils is shown in Drawing No. 3SM 1819D. Permanent excavation slopes will have to be made very flat to insure stability after filling of the reservoir and to reduce differential settlements where the embankment is founded on the compressible soils. The actual required extent of excavation and the side slopes will have to be determined in the design stage when more complete information becomes available. The excavation layout shown in 3SM 1819D can be used for the purposes of an economic analysis and comparison.

3.3.2 Foundation Seepage Control

Seepage through the pervious deposit encountered in the upper 42 feet of boring B-5 will have to be controlled by either constructing a cut-off through this deposit or by placing an impervious blanket over it for some distance upstream of the dam. The excavated gray silts and clays may be suitable for this purpose. The method should be selected in the design stage based on a more complete subsurface exploration program.

On the basis of presently available information, the bouldery glacial till, found below a depth of 42 feet in boring B-5 and underlying the silts and clays in other borings, is considered to be sufficiently impervious that a complete cut-off will not be required through it. However, this material should be investigated in greater detail in design. Where the dam is placed directly on this material, a shallow core trench will have to be excavated in this material to an assumed depth of 5 feet. This will serve to "key" the embankment to the foundation, preventing a seepage path along the contact between the embankment and the foundation.

Where the dam is to be founded on bedrock, the rock foundation can be expected to require the following treatment:

1. Excavation of a cut-off trench to intact rock.

2. Cleaning of the rock surface with water jets.

3. Filling of open cracks in the rock surface with a thick grout or a wet concrete. The lateral limits for this treatment are shown in Drawing No. 3SM 1819F.

4. Installation of a grout curtain to reduce seepage through the openings in the rock. For estimate purposes the grout holes can be assumed to be 60 feet deep, spaced at 5 feet center-to-center, and taking 0.2 sacks of cement per foot of depth in each hole. The anticipated lateral limits of the grout curtain are shown in Drawing No. 3SM 1819G.

3.3.3 Cross Section of Dam

A preliminary dam cross-section to be used for an economic analysis is shown in Drawing No. 3SM 1819F. The top width of 32 feet was shown in a layout dated October 1971, received from your office. The one vertical on two and one-half horizontal downstream slope and one vertical on three horizontal upstream slope shown in this layout are good preliminary estimates. Buttress fills, as shown in Drawing No. 3SM 1819G may be required at the right abutment, where the embankment will rest, in part, on the low-strength silts and clays.

For the time being, the dam can be assumed to be homogeneous. During the design stage, the cross-section of the dam can be modified based on an analysis of the availability of various types of borrow materials and of their strength and other properties.

The drainage blanket should consist of a processed granular material designed to prevent erosion of the adjacent material while having adequate permeability for the amount of flow it may be required to carry. The drainage blanket should be extended up into the body of the dam in the form of a "chimney drain" for the following reasons:

1. It provides a more positive way of intercepting seepage and, thereby, a margin of safety that is considered desirable because of the damage potential downstream of the dam.

2. The consideration that supporting the right end of the dam on compressible soils will lead to differential settlements which could cause the development of cracks in the dam. The chimney drain will still intercept seepage and help prevent progressive erosion, should a transverse crack occur in the dam.

To estimate the cost, the drainage blanket and chimney drain can be assumed as being 8 feet thick.

The depth of the cut-off or key trench will vary depending on the foundation conditions that will be disclosed by more detailed subsurface explorations and during construction.

For estimate purposes the upstream slope protection against wave action can be assumed to be an 18-inch layer of stone filling (medium), supported on a six-inch layer of bedding material. For a description of these materials, see N.Y.S. Department of Transportation Standard Specifications of January 2, 1973. The slope protection can be discontinued five feet below normal low water level. The downstream slope can be protected against surface erosion by topsoiling and seeding.

3.3.4 Spillway

The closest boring to the proposed location of the spillway control structure is B-1. Very compact silty material, that will provide adequate support for the structure, was found in this boring at a depth of 40 feet (Elev. 822). The boring was terminated at Elev. 784 without encountering bedrock. If the spillway control structure is placed on soil instead of rock, particular attention should be paid to controlling seepage around and under the structure, so that high hydraulic gradients would not cause piping or erosion. The location of the spillway may have to be adjusted during design to obtain a good foundation for the spillway chute. Provisions for seepage control and drainage will have to be included in the design of the chute, in order to control uplift forces and prevent erosion.

The ridge between the reservoir and spillway outlet channel is relatively narrow. The silty material found in boring B-1, although quite compact, will not be very erosion-resistant when saturated and exposed on a slope. There is little doubt that, after construction of the proposed dam and impoundment of the reservoir, the natural slope on the west side of the spillway outlet channel will become saturated to a considerable height. Therefore, a method, such as shown in Drawing No. 3SM 1819G, consisting of a triangular section of fill containing perforated underdrain pipe surrounded by filter material, will have to be used to keep the saturated soils weighted down and to collect seepage from the slope. The filter material will have to be similar to that used for the drainage blanket in the dam. The material placed over the filter material should be similar to the embankment material used in the dam.

3.4 Alternate Site

3.4.1 Removal of Soft Soils

Based on the information available from borings A-2 and A-3, the knob of land crossed by the axis of the proposed dam consists, above Elev. 740, mainly of soft to firm silts and clays. Considering their assumed low strength and the topography of the knob, the dam cannot be constructed on these soils with any certainty that it will be stable. Therefore, we anticipate that the silts and clays will have to be removed for their full depth and for such a width as to permit the dam to be constructed across the knob on a foundation of compact glacial till. The anticipated limits of removal are shown in Drawing No. 3SM 1819E. The excavation slope in the silts and clays downstream of the dam can be made steeper than elsewhere, because filling of the reservoir will not affect its stability and a slope failure here would not endanger the dam.

A smaller deposit of silts and clays is found at the right abutment of the dam. This should also be removed and sloped back as shown in Drawing No. 3SM 1819E. At this stage total removal appears to be more economical than partial removal and construction of buttress fills. Approximate limits of removal are shown on this drawing to permit an estimate of the quantity of removal.

3.4.2 Flattening of Steep Slopes

At the proposed Alternate Site for the dam, Sixmile Creek flows in a steep-sided gorge. Steep abutments are not desirable for an earth dam for the following reasons:

1. It is difficult to get good contact between the embankment and the rock face of the abutment when compacting against a steep jagged slope.

2. Differential settlement within the dam, caused by abrupt changes in the height of the dam, can lead to cracking.

Therefore all natural slopes beneath the dam should be flattened to an inclination not steeper than 1 on 1.

3.4.3 Foundation Seepage Control

The pervious sand deposit found in boring A-1 will require special treatment. It cannot be ascertained from the available information whether this deposit occurs at ground surface below the level of the proposed reservoir and, if so, over how large an area. Depending on the findings of a more detailed investigation in the design phase, a deep cut-off, an impervious upstream blanket combined with relief wells downstream of the dam, or just relief wells may be required.

Elsewhere, where the dam is constructed on compact and relatively impervious soils, a minimum five feet deep key trench will be required. Where the dam is founded on rock the trench should extend to intact rock.

The rock foundation in contact with the impervious material near the central part of the dam will have to be cleaned with high pressure water jets. Subsequent to the cleaning, open fissures and cracks in the rock should be filled with thick grout to prevent loss of fine-grained materials into the rock. The steep rock slopes will probably have to be gunited. Limits for this treatment are shown in Drawing No. 3SM 1819F. A grout curtain will be required in the rock. The anticipated lateral limits of the grout curtain are shown in Drawing No. 3SM 1819H. For estimate purposes, it can be assumed that the grout holes will be 60 feet deep, spaced at five-foot intervals, and that the average grout take will be 0.2 bags of cement per linear foot of grout hole.

3.4.4 Cross-section of Dam

A crest width of 32 feet, the same as shown in a layout for the Bethel Grove Site, was assumed also for the proposed dam at the Alternate Site. The side slopes of 1 vertical on 3 horizontal upstream and 1 vertical on 2½ horizontal downstream as shown by your office, are appropriate at this stage. The actual side slopes should be based on a detailed analysis during design.

In general, the same considerations regarding the cross-section of the dam as at the Bethel Grove Site apply. The homogeneous earth dam shown should be subject to review based on an analysis of the availability of various types of embankment materials during the design stage. If a zoned dam is selected, the thickness of the impervious core may have to be increased where it contacts the steep rock abutments.

The drainage blanket under the downstream portion of the dam should be extended up into the body of the dam as a "chimney drain" for the additional safety it provides. The preliminary dimensions and limits of the chimney drain and drainage blanket are shown in Drawing No. 3SM 1819F.

The possibility of transverse cracking in the upper part of the dam, as a result of the steep valley sides, should be given careful thought in the design. Some of the precautionary measures that might be employed are:

1. Careful selection and control of materials and construction procedures to minimize cracking.

2. Widening of drainage zones in the critical areas to enable them to carry increased flow if cracking occurs.

3. Scheduling of embankment construction to minimize differential settlements.

The same type of material as that described for the Bethel Grove Site will provide adequate protection of the upstream slope against wave action. The downstream slope can be protected against erosion by topsoiling and seeding.

3.4.5 Spillway

A modified spillway layout is shown in Drawing No. 3SM 1819H. The main modification has been an increase in the width of the approach channel to reduce the velocity and improve the efficiency of the spillway. A side channel spillway should be considered, if it is found that the cut slopes for the proposed alignment encroach on the adjacent highway. If a bridge is to be built across the spillway, a side channel spillway will require a shorter structure.

Tentatively we have assumed a stilling basin at about elevation 750. The flow from the stilling basin to the creek channel would be uncontrolled down the rock slope, except for a training wall at the bottom of the slope, directing flow away from the dam.

Cut slopes in this type of rock are usually designed at an inclination of 1 vertical on 1 horizontal. The excavation for the spillway will be partly in earth and partly in rock. Therefore an average inclination for rock and soil of 1 vertical on 2 horizontal can be assumed for the spillway cut slopes for preliminary estimate purposes.

3.4.6 Considerations for Concrete Dam

For the concrete dam scheme transmitted with your cost estimates of October 10, 1971, the recommendations for foundation treatment discussed for an earth dam generally apply with the following exceptions:

1. The highest part of the dam will be constructed as a concrete gravity dam.

2. The proposed spillway in the right abutment will be eliminated. Instead, the concrete dam is provided with a central overflow section.

3. Special treatment will be required at the junction between the concrete and the earth fill sections of the dam.

The subsurface explorations indicate that bedrock at the Alternate Site occurs at a lower elevation than assumed in the upstream elevation of the concrete dam scheme included with your cost estimates. Based on very limited data, it is anticipated that the average depth to suitable rock on which to found the concrete dam will be about 10 feet below bedrock surface.

Critical locations for the safety of the project will be the junctions between the concrete dam and the abutting earth fill sections. An adequate system of cut-offs and drains should be provided here to minimize the quantity of seepage, prevent piping, and control hydrostatic pressures in the fills.

A grout curtain similar to that for the earth dam alternates discussed above will be necessary below the dam, near the upstream toe. The lateral limits of the grout curtain are indicated in Drawing No. 3SM 1819H. A line of drainage holes should be provided just downstream of the grout curtain, in order to reduce uplift pressures under the dam. A drainage gallery should be included in the body of the dam. This gallery will collect drainage from the drainage holes and facilitate additional grouting if such should prove necessary.

3.5 Availability of Construction Materials

Impervious soil for the embankment will be available, at least in part, from required excavation. If additional impervious material is required, glacial till would be the optimum material for a homogeneous dam because of its low permeability and high strength. Pervious materials for a zoned dam are available from terrace deposits in the proposed reservoir area.

The filter material for the drainage blanket in the dam will require high-quality gravel. Such gravel is available at Brooktondale, 3 or 4 miles southeast of the proposed damsites. This gravel, however, will most probably require processing to obtain the required gradation.

The stone used for protecting the upstream slope against wave action has to be highly resistant to weathering. The nearest known source of acceptable stone is the Cayuga Crushed Stone Corp. quarry south of Ludlowville.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 General

The need for a reservoir at this location should be weighed carefully against the potential damage downstream in case of a failure.

4.2 Required Foundation Treatment

The difficult foundation conditions existing at the two sites under consideration will dictate special treatment to insure the safety of the dam. A preliminary appraisal of the required treatment is described above and summarized below. The actual treatment should be based on extensive analyses of stability, settlement, and seepage. This treatment will add materially to the cost of this project and should be included in the cost estimates when evaluating the feasibility of the project. For the most part, the types of required treatment are similar at the two sites.

1. Removal and sloping back of low-strength foundation soils. The gray silts and clays should not be considered as potential embankment material.

2. Flattening of rock slopes beneath the dam at the Alternate Site to not steeper than 1 on 1.

3. Surface grouting and/or guniting of fissures in the surface of the rock foundation.

4. Cut-offs through pervious materials. This is an item which may be very expensive but regarding the extent of which we have comparatively little information. Shallow key trenches will be sufficient in other materials.

5. Grout curtain in rock where the dam is on a rock foundation.

6. A chimney drain in the dam.

7. Cut-offs and collector drains for the spillway control structure at the Bethel Grove Site.

8. A seepage collection and slope stabilizing system for the slope on the west side of the spillway chute and outlet channel at the Bethel Grove Site.

9. Cut-offs and collector drains at the junction between concrete and earthfill sections if a concrete dam is considered for the Alternate Site.

4.3 Subsurface Investigation Program for Design

The subsurface investigation program for the design of this project should be planned so as to:

1. Measure those properties of the subsurface deposits that will affect the design and performance of the project. To accomplish this, the following will be required:

   a. Borings to obtain soil samples and rock cores for identification and testing.

   b. Test pits and trenches to examine and sample materials, such as the bouldery glacial till, that cannot be sampled satisfactorily using small-diameter equipment.

   c. Field permeability tests in soils and bedrock.

   d. The use of a bore hole camera to investigate zones in rock that exhibit poor core recovery.

2. Delineate adequately the boundaries between the different foundation strata. This will require:

   a. A combination of surface reconnaissance, borings, and test trenches to find the surface and subsurface contacts between the foundation strata.

b. A flexible program, with the information available at any one time used to determine the location of further explorations.

c. Close cooperation between the drill crews and the designer. It is recommended that the designer personally oversee the subsurface exploration program in the field.

3. Determine the properties of construction materials, including those that will have to be brought in from sources off the site and the extent of these sources. An analysis of the types of materials available on site will indicate what materials will have to be imported. The U.S. Department of Agriculture Soil Survey report will be of value in locating sources of construction materials. Laboratory tests should be performed on the materials to ascertain their suitability for their intended use and to obtain data for use in design.

APPENDIX

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. E103CC

HOLE NO. A-2
LINE & STA. _____
See Coordinates below
OFFSET _____

PROJECT CAYUGA LAKE BASIN - SIX MILE CREEK DAMSITE
QUAD. LOCATION 75/1/3/c 32 DATE, START 11/12/71 SURF. ELEV. 809.1
SOIL SERIES DUNKIRK DATE, FINISH 12/23/71 DEPTH TO WATER -30.0 ft
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75 I.D. 2.25 WEIGHT OF HAMMER 300 lbs. HAMMER FALL
SAMPLER O.D. 2.00 I.D. 1.50 INSIDE LENGTH OF SAMPLER 18" CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	N 880,500 REMARKS E 532,100
0	12										
	32										
	18										
	12										
5	11										
	16	J-1	2	2				D	BR	SILT & GRAVEL, SO. SAND (FRIABLE)	6.0'-6.5'
	14				3						
	17										
	13										
10	12										
	15	J-2	2	2				D	BR	GRAVEL, SO. SILT & SAND	10.0'-11.5'
	15				3						
	16										
	14										
15	12										
	32	J-3	7	7				D	BR	GRAVEL, SO. SILT & SAND	15.0'-16.5'
	45				8						
	53										
	42										
20	39										
	32		4	5						LOST SAMPLE	20.0'-21.5'
	41				6						
	43										
	47										
25	49										
	45	J-4	3	5				M	GRY	SILT, TR. CLAY, SAND & GRAVEL	25.0'-26.5'
	48				4						
	48										
	76										
30	81										GW
	65	J-5	9	7				M	GRY	SILT, TR. CLAY	30.0'-31.5'
	85				7						
	69										
	82										
35	78										
	71	J-6	2	3				W	GRY	SILT, SO. CLAY	35.0'-36.5'
	90				3						
	66										
	72										
40	72										
	66	J-7	3	3				W	GRY	SILT, SO. CLAY, TR. SAND	40.0'-41.5'
	72				3						
	55										
	56										M.C. = 24.5 %
45	53										
	60	J-8	1	2				W	GRY	SILT, SO. CLAY, TR. FINE GRAVEL	45.0'-46.5'
	56				2						
	56										
	47										
50	45										

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DRILL RIG OPERATOR J. BLOCK
SOIL DESCRIPTIONS A. FRANKE
ROCK DESCRIPTIONS A. FRANKE
DISTRICT SOILS ENGR. J. CHRISTOPHER

SHEET 1 OF 3. HOLE NO. A-2

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY TOMPKINS
PROJ. NO. E103300

HOLE NO. A-2
LINE & STA. See Coordinates Below
OFFSET

PROJECT CAYUGA LAKE BASIN - SIX MILE CREEK DAMSITE
QUAD. LOCATION TS/1/SW 32 DATE, START 11/12/71 SURF. ELEV. 809.1
SOIL SERIES DUNKIRK DATE, FINISH 12/23/71 DEPTH TO WATER -30.0 ft
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75 I.D. 2.25 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL CASING 18" SAMPLER 18"
SAMPLER O.D. 2.00 I.D. 1.50 | INSIDE LENGTH OF SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	N 880,500 REMARKS E 532,100
50	56	J-9	2	2							
	54				2			W	BR	CLAY & SILT	50.0'-51.5'
	40										
	53										
	62										
55	81	J-10	1	1						SILT, SO. CLAY,	
	79				2			W	BR	TR. GRAVEL	55.0'-56.5'
	71										
	53										
	60										
60	69	J-11	2	3							
	44				3			W	BR	SILT, SO. CLAY	60.0'-61.5'
	65										
	85									(TILL)	
	67									SILT, SO. FINE TO MED.	
65	54	J-12	48	59				M	BR	GRAVEL & SAND, TR. CLAY	65.0'-66.5'
	96				84						
	64										
	125									(SANDY TILL)	
	80										
70	106	J-13	16	54						SILT & SAND, SO. FINE	
	86				67			M	BR	GRAVEL, TR. CLAY	70.0'-71.5'
	77										DRILLED WITH QUARRY BIT: 71.5 TO 75.0'
	111									(TILL)	
	75	J-14	100/3"							SILT & FINE SAND, SO.	
75	100							M	GRY	GRAVEL, TR. CLAY	75.0'-75.3'
	120										
	95										DRILLED WITH QUARRY BIT: 75.3'-80.0'
	110										
80	66		100/3"							LOST SAMPLE	80.0'-80.3'
	122										DRILLED WITH QUARRY BIT: 80.3'-85.0'
	80										
	80										
	96									FINE TO MED. GRAVEL &	
85	83										
	122	J-15	69	100				W	BR	SILT, SO. SAND, TR. CLAY	85.0'-86.0'
	106						0				DRILLED WITH "AX" DIAMOND BIT: REC: 6" 7 pcs.
	90						0				
	89										
90	88	J-16	DRILLED						GRY	LIMESTONE BOULDERS	86.0'-90.0'
	B540	J-17	61	76						SILT & GRAVEL, SO.	
	4505				98			W	GRY	SAND, TR. CLAY	90.0'-91.5' ("E" SPOON)
	430						0				QUARRY BIT REFUSED - DRILLED WITH "Ax" DIAMOND BIT: REC: 6" SEVERAL PCS.
	300										
95	320						0				
	360	J-18	DRILLED						GRY	LIMESTONE BOULDERS	91.5'-96.0'
	365	J-19	45	75						SILT, SO. GRAVEL, TR.	
	570				86			W	GRY	SAND & CLAY	96.0'-97.5' ("E" SPOON)
	125										
100	136										

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DRILL RIG OPERATOR J. BLOCK
SOIL DESCRIPTIONS A. FRANKE
ROCK DESCRIPTIONS A. FRANKE
DISTRICT SOILS ENGR. J. CHRISTOPHER F.

SHEET 2 OF 3. HOLE NO. A-2

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY TOMPKINS
PROJ. NO. E10300

HOLE NO. A-2
LINE & STA. See Coordinates Below
OFFSET

PROJECT CAYUGA LAKE BASIN - SIX MILE CREEK DAMSITE
QUAD. LOCATION 15/1/3/4 32 DATE, START 11/12/71 SURF. ELEV. 809.1
SOIL SERIES DUNKIRK DATE, FINISH 12/23/71 DEPTH TO WATER -30.0ft
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75 I.D. 2.25 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL
SAMPLER O.D. 2.00 I.D. 1.50 | INSIDE LENGTH OF SAMPLER 18" | CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	N 880,500 E 532,100 REMARKS
100	146	J-20	27	56				W	GRY	SILT	100.0'-101.5' ("E" Spoon)
	184				92						
	202										
	188										
105	2000										
	165										
	485										
	285										
	980										
110	1431	J-21	41	100/5"						SILT, TR. FINE GRAVEL & FINE SAND	
	941							W	BR		110.0'-110.9' ("E" Spoon)
	913	J-22	DRILLED							REC: 2" 4 PIECES	DRILLED WITH
	1152								GRY	LIMESTONE BOULDERS	110.9'-112.4' "AX" DIAMOND
	1017										
115	983										
	749										
	702										WASH SAMPLE TAKEN FROM 112.4' TO 130.0' SAMPLE REPRESENTS MATERIAL TAKEN FROM ABOVE & BELOW.
	491										
	456										
120	379										
	291										
	621										
	2476										
	1970										
125	651										
	522										
	300										DRILLED WITH "AX" DIAMOND BIT: REC: 4" 7 pcs.
	322										
	391										
130	4980	J-23	DRILLED						GRY	LIMESTONE BOULDERS	112.4'-130.0'
	↑	J-24	31	68	100/4"			W	BR	SILT & COARSE SAND, TR. MEDIUM GRAVEL	130.0'-131.4' "E" Spoon
135											WASH SAMPLE TAKEN FROM 131.4 TO 150.0' SAMPLE REPRESENTS MATERIAL TAKEN FROM ABOVE.
140	NOT CASED									RECOVERED 12" 6 PIECES & CHIPS	
145										ASSORTED BOULDERS	DRILLED WITH "AX" DIAMOND BIT: 131.4' TO 150.0'
150	↓	J-25	DRILLED							BOTTOM OF HOLE @ 150.0'	

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DISTRICT SOILS ENGR. J. CHRISTOPHER

SHEET 3 OF 3. HOLE NO. A-2

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY TOMPKINS
[redacted]. PROJ. NO. 1030070

HOLE NO. A-3
LINE & STA. N 880, 865
OFFSET E 532, 410

PROJECT CAYUGA LAKE BASIN (6 MILE CREEK DAMSITE)
QUAD. LOCATION 75/1/SW 32 DATE, START 1-6-72 SURF. ELEV. 793.2
SOIL SERIES DUNKIRK DATE, FINISH 2-9-72 DEPTH TO WATER UNOBSERVED
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75 I.D. 2.25 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL. CASING 18" SAMPLER 18"
SAMPLER O.D. 2.00 I.D. 1.50 | INSIDE LENGTH OF SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0	12										
	25										
	34										
	41										
	46										
5	59	J-1	11	9				M	GRY BR	VARVED SILT	5.0'-6.5'
	25				8						
	34										
	47										
	41										
10	46	J-2	6	8				W	BR	SILT, TR. CLAY	10.0'-11.5'
	47				10						
	43										
	66										
	94										
15	43	J-3	12	10				W	BR	SILT	15.0'-16.5'
	21				10						
	19										WOH = WEIGHT OF HAMMER
	21										
	18										
20	32	J-4	WOH	1				W	GRY	SILT, SO. CLAY, TR. GRAVEL	20.0'-21.5'
	27				2						
	26										
	24										
	28										
25	32	J-5	1	1				W	GRY	SILT, TR. CLAY & GRAVEL	25.0'-26.5'
	21				1						
	24										
	24										
	28										
30	22	J-6	1	2				W	GRY	SILT, SO. CLAY, TR. FINE GRAVEL	30.0'-31.5'
	27				1						
	28										
	24										
	25										
35	42	J-7	1	1				W	GRY	SILT, SO. CLAY	35.0'-36.5'
	45				2						
	52										
	54										
	67										
40	77	J-8	1	2				W	GRY	SILT & CLAY	40.0'-41.5'
	91				1						
	75										
	74										
	78										
45	78	J-9	2	1				W	GRY	SILT, TR. CLAY	45.0'-46.5'
	77				2						
	77										
	77										
50	78										

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DRILL RIG OPERATOR J. BLOCK
SOIL DESCRIPTIONS A. FRANKE
ROCK DESCRIPTIONS A. FRANKE
DISTRICT SOILS ENGR. J. CHRISTOPHER AF.
SHEET 1 OF 3. HOLE NO. A-3

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. 10300701

HOLE NO. A-3
LINE & STA. N 880,865
OFFSET E 532,470

PROJECT Cayuga Lake Basin (6 Mile Creek Damsite)
QUAD. LOCATION 75/1/3/4 32 DATE, START 1-6-72 SURF. ELEV. 793.2
SOIL SERIES Dunkirk DATE, FINISH 2-9-72 DEPTH TO WATER None Observed
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75 I.D. 2.25
SAMPLER O.D. 2.00 I.D. 1.50
WEIGHT OF HAMMER 300 lbs.
INSIDE LENGTH OF SAMPLER 18"
HAMMER FALL
CASING 18" SAMPLER 18"

DEPTH IN FLOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
50	75	J-10	3	5				W	Gry	Silt & Gravel, So. Fine Sand, Tr. Clay	50.0'-51.5'
	76				6						
	191										
	396										
	131										
55	230		41	100/2"						Lost Sample	55.0'-55.7'
	160										Drilled with Hawthorne Bit 55.7' to 60.0'
	180										
	500										
	420										
60	319	J-11	35	76				W	Gry	Sand, Silt & Shaley Gravel	60.0'-61.2' "E" Spoon
	304				100/3"						
	300										Drilled with Hawthorne Bit 61.2'-65.0'
	315										
	195										
65	83	J-12	26	86				W	Gry	Sand, Silt & Fine Gravel	65.0'-66.3' "E" Spoon
	156				100/4"						
	277										Drilled with Hawthorne Bit: 66.3'-69.5'
	282										
	327										
70	620										Drilled with "AX" Diamond Bit: Rec: 12" 10 pcs.
	2873										
	332										
	604	J-13	Drilled						Gry	Limestone Boulders	69.5'-74.5'
75	8.9	J-14	100/4"					W	Gry	Fine to Med. Gravel, So Sand, Tr. Silt	Boulder Buster at 74.5' ("E" Spoon) 74.5'-74.9'
	1132										
	1944										
	2315										Drilled with "AX" Diamond Bit: Rec: 8" Several pieces
	532										
80		J-15	Drilled						Gry	Boulders	74.9' to 80.0'
										This run started at 80.0' & progressed hole in 10.0' intervals drilled ten feet, then added ten feet of rod without retracting rods & core barrel.	Drilled with "AX" Diamond Bit 80.0' to 150.0'
85											
	Not Cased										
90											
95										Recovered Assorted Boulders	
100											Continued

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS A. Franke
ROCK DESCRIPTIONS A. Franke
DISTRICT SOILS ENGR. J. Christopher
SHEET 2 OF 3. HOLE NO. A-3

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY TOMPKINS
[redacted]. PROJ. NO. 10300 70'

HOLE NO. A-3
LINE & STA. N 880,865
OFFSET E 532,470

PROJECT CAYUGA LAKE BASIN (6 MILE CREEK DAMSITE)
QUAD. LOCATION 75/1/3/632 DATE, START 1-6-72 SURF. ELEV. 793.2
SOIL SERIES DUNKIRK DATE, FINISH 2-9-72 DEPTH TO WATER NONE OBSERVED
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2:75 I.D. 2:25
SAMPLER O.D. 2:00 I.D. 1:50
WEIGHT OF HAMMER 300 lbs.
INSIDE LENGTH OF SAMPLER 18"
HAMMER FALL
CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
100											DRILLED WITH "AX" DIAMOND BIT TO 150.0'
105											
110											
115											
120	NOT CASED										
125											
130											
135											
140										RECOVERED ASSORTED BOULDERS REC: 21" 5 pcs. & CHPS. 80.0'-150.0'	
145		J-16	DRILLED								
150										BOTTOM OF Hole @ 150.0'	

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR J. BLOCK
SOIL DESCRIPTIONS A. FRANKE
ROCK DESCRIPTIONS A. FRANKE
DISTRICT SOILS ENGR. J. CHRISTOPHER

SHEET 3 OF 3. HOLE NO. A-3

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
PROJ. NO. E10.300.

HOLE NO. A-4
LINE & STA. ℄ 6+00
OFFSET 810' Rt.

PROJECT Cayuga Lake Basin; Sixmile Creek Damsites
QUAD. LOCATION 75-1-NW 32. DATE, START 14 June 72 SURF. ELEV. 786.0'
SOIL SERIES Dunkirk DATE, FINISH 28 June 72 DEPTH TO WATER None observed (ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75 I.D. 2.25 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL CASING 18" SAMPLER 18"
SAMPLER O.D. 2.00 I.D. 1.50 | INSIDE LENGTH OF SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0	10										
	16										
	16										
	20										
5	21									Dense Silt, trace of weathered Shale,	
	17	J-1	6	7				m	Br.	Slightly Plastic.	5.0' ~ 6.5'
	19				8						
	26										
	28										
	36									Dense Silt	
10	56	J-2	7	12				m	Br.	Slightly Plastic.	10.0' ~ 11.5'
	56				12						
	55										
	45										
	47									Dense Silt, trace	
15	12	J-3	6	8				m	Br.	of Fine Sand.	15.0' ~ 16.5'
	96				11						
	102										
	92										
	80										
20	70	J-4	2	2				w	Grey	Silt, Some Clay.	20.0' ~ 21.5'
	94				4						
	78										
	70										
	61										
25	45	J-5	1	1				w	Grey	Silt, Some Clay.	25.0' ~ 26.5'
	98				4						
	107										
	93									Silt, Some Clay, to	
	103									Silty Some Shaley	
30	56	J-6	5	8				w	Grey	Gravel & Sand, tr. Clay.	30.0' ~ 31.5'
	50				47						
	60										Drilled with "AX" Diamond bit 32.6' ~ 35.0'
	75	C-7	Drilled							Sandstone Boulders	Rec. = 5" 3 pcs. + Frags.
	87									Fine Gravel & Course Sand	
35	191	J-8	21	52				m	Grey	So. Silt, tr. weat. Shale pcs.	35.0' ~ 36.5'
	175				77						
	250										Drilled with "AX" Diamond bit 36.5' ~ 40.0'
		C-9	Drilled						Grey	Sandstone & Shale	Rec. = 3" 1 pcs + Frags.
40											Drilled with "AX" Diamond bit 40.0' ~ 45.0'
										Sand stone &	Rec. = 22"
		C-10	Drilled						Grey	Limey Sandstone	12 pcs + Frags.
45											Drilled with "AX" Diamond bit 45.0' ~ 50.0'
										Sandstone &	Rec. = 18"
		C-11	Drilled						Grey	Limey Sandstone	6 Pcs. + Frags.
50											

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS J.F. Oxs Chambeau
ROCK DESCRIPTIONS B.L. Dawson
DISTRICT SOILS ENGR. J.E. Christopher B.L.O.

N

SCALE

1000 0 1000 2000 3000 FEET

CONTOUR INTERVAL 10 FEET

STATE OF NEW YORK

DEPARTMENT OF TRANSPORTATION

BUREAU OF SOIL MECHANICS

CAYUGA LAKE BASIN

SIXMILE CREEK

P.I.N. E103.00.701.02

SITE LOCATION PLAN

APPROVED JULY 13 1972

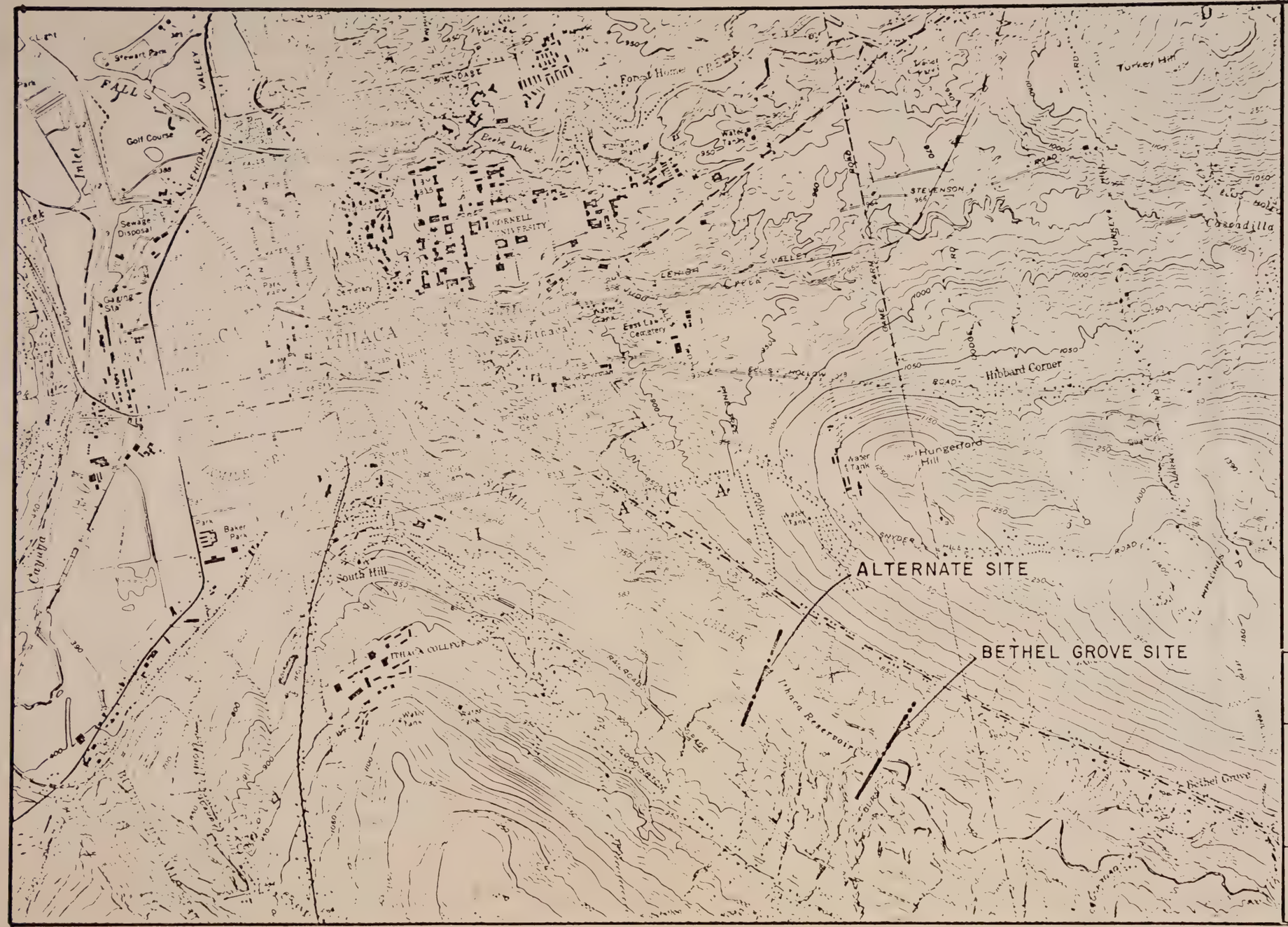
L. H. Tillman

DIRECTOR

REGION NO. 3

COUNTY TOMPKINS

DRAWING NO. 3 SM 1819A



N

SCALE

1000 0 1000 2000 3000 FEET

CONTOUR INTERVAL 10 FEET

STATE OF NEW YORK

DEPARTMENT OF TRANSPORTATION

BUREAU OF SOIL MECHANICS

CAYUGA LAKE BASIN

SIXMILE CREEK

P.I.N. E103.00.701.02

SITE LOCATION PLAN

APPROVED JULY 13 1972

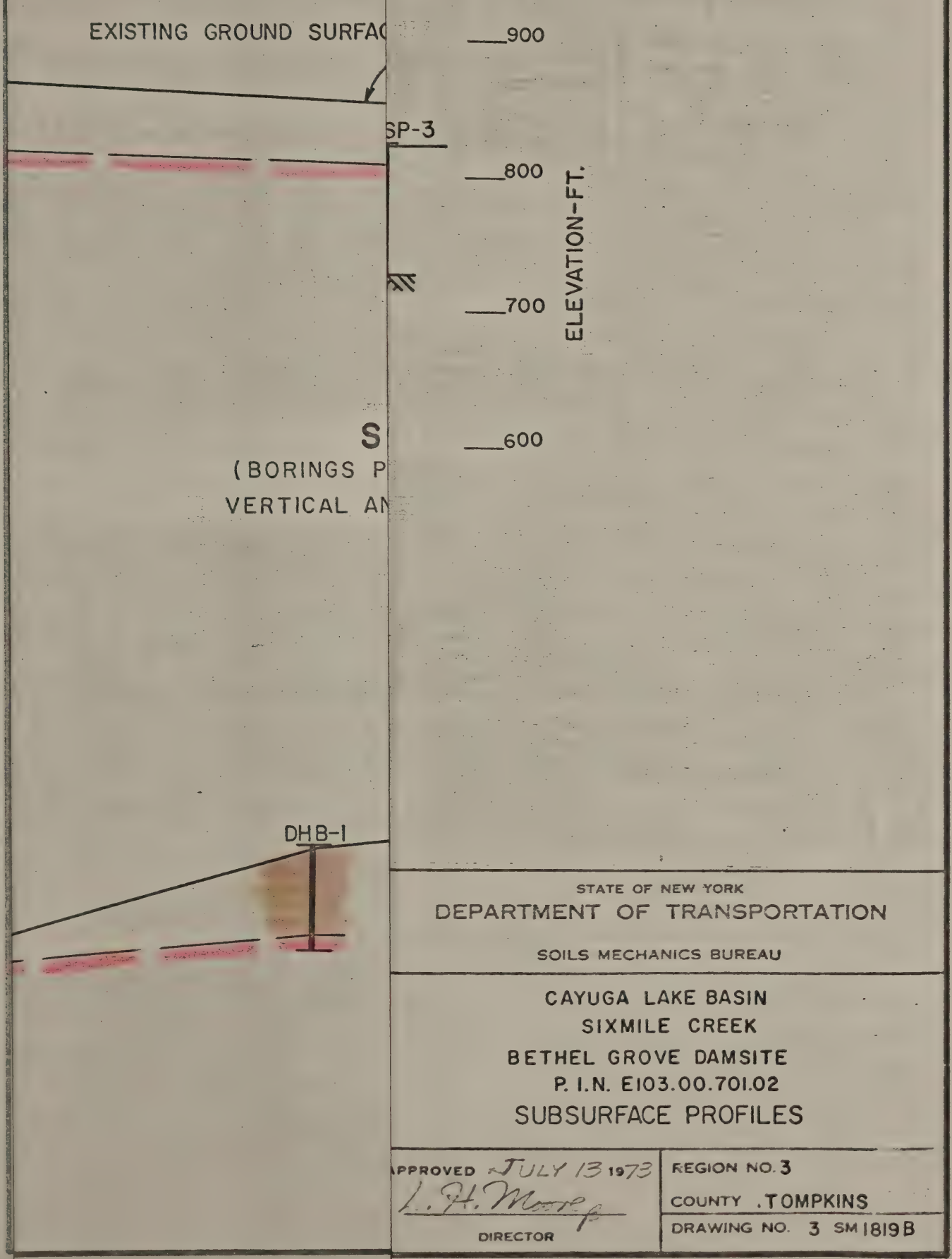
L. H. Gilman

DIRECTOR

REGION NO. 3

COUNTY TOMPKINS

DRAWING NO 3 SM 1819A



STATE OF NEW YORK

DEPARTMENT OF TRANSPORTATION

SOILS MECHANICS BUREAU

CAYUGA LAKE BASIN

SIXMILE CREEK

BETHEL GROVE DAMSITE

P. I. N. E103.00.701.02

SUBSURFACE PROFILES

APPROVED JULY 13 1973

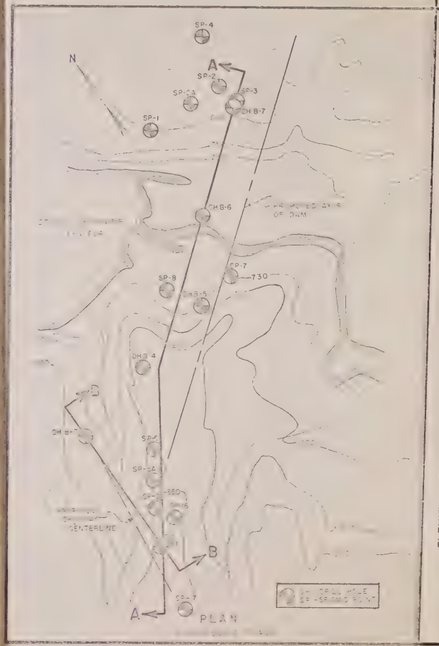
L. H. Moore

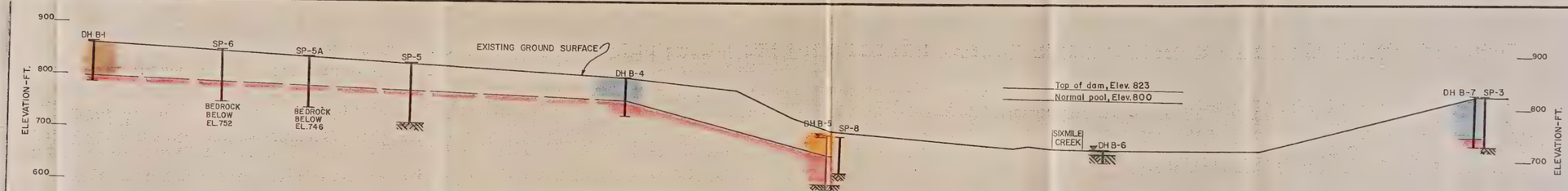
DIRECTOR

REGION NO. 3

COUNTY . TOMPKINS

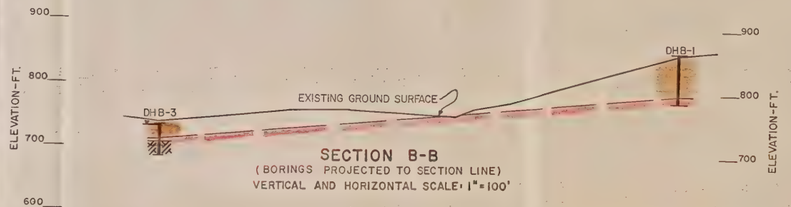
DRAWING NO. 3 SM 1819B





SECTION A-A

(BORINGS PROJECTED TO SECTION LINE)
VERTICAL AND HORIZONTAL SCALE: 1"=100'



SECTION B-B

(BORINGS PROJECTED TO SECTION LINE)
VERTICAL AND HORIZONTAL SCALE: 1"=100'

PREPARED BY: Gustavo R. Schnore
DRAWN BY: Joe Maier
CHECKED BY: Gustavo R. Schnore

LEGEND

SP Seismic Point
DH Drill Hole
Observed Water Level
Alluvium (assorted materials, ranging from silts to coarse gravels).
Soft to stiff layered silts and clays.
Compact to very compact mixtures of silts and fine sands, with lesser amounts of gravel and clay.
Compact gravel with small amounts of sand and silt.
Very compact mixtures of sand, gravel, silt and clay with numerous boulders (bouldery glacial till).
Bedrock

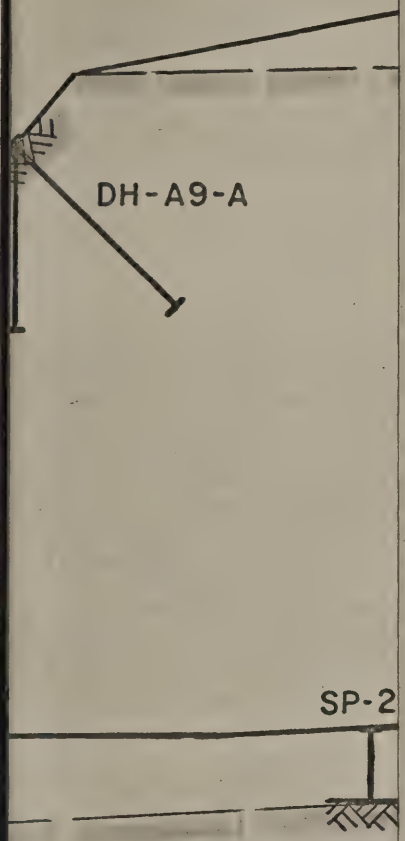
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

CAYUGA LAKE BASIN
SIXMILE CREEK
BETHEL GROVE DAMSITE
P.I.N. E103.00.701.02

SUBSURFACE PROFILES

APPROVED June 13 1973
L. H. Moore
DIRECTOR

REGION NO. 3
COUNTY TOMPKINS
DRAWING NO 3 SM 1819B



STATE OF NEW YORK

DEPARTMENT OF TRANSPORTATION

SOILS MECHANICS BUREAU

CAYUGA LAKE BASIN
SIXMILE CREEK
ALTERNATE DAMSITE

P.I.N. E103.00.701.02

SUBSURFACE PROFILES

APPROVED JULY 13 1973

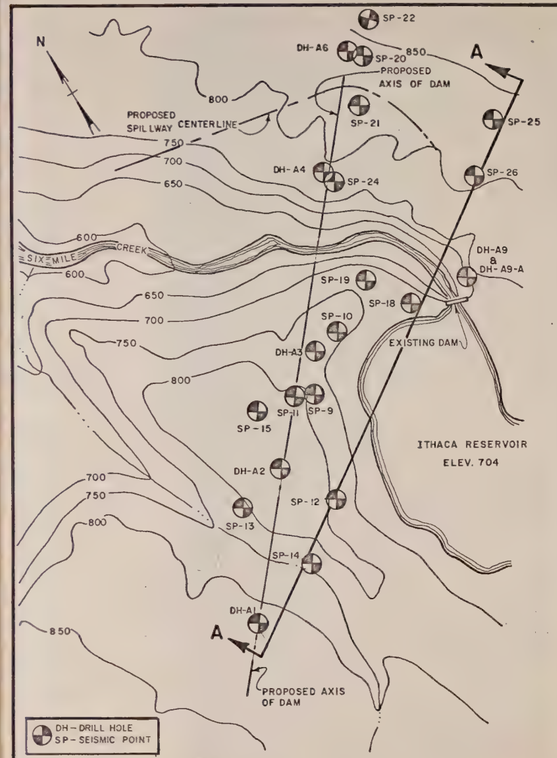
L. H. Moore

DIRECTOR

REGION NO. 3

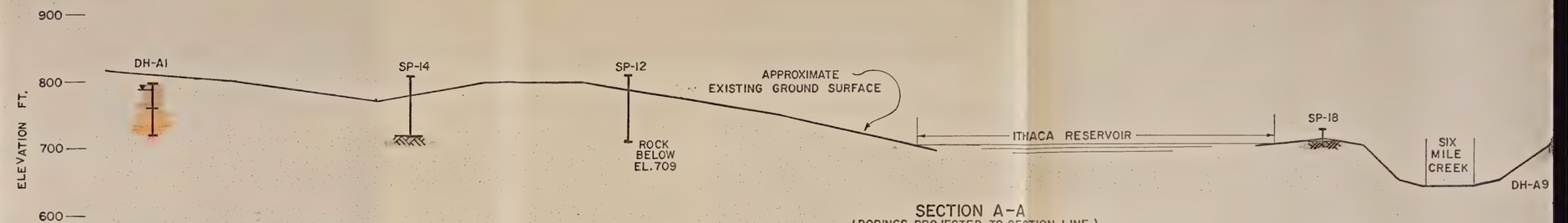
COUNTY TOMPKINS

DRAWING NO. 3 SM 1819 C



PLAN

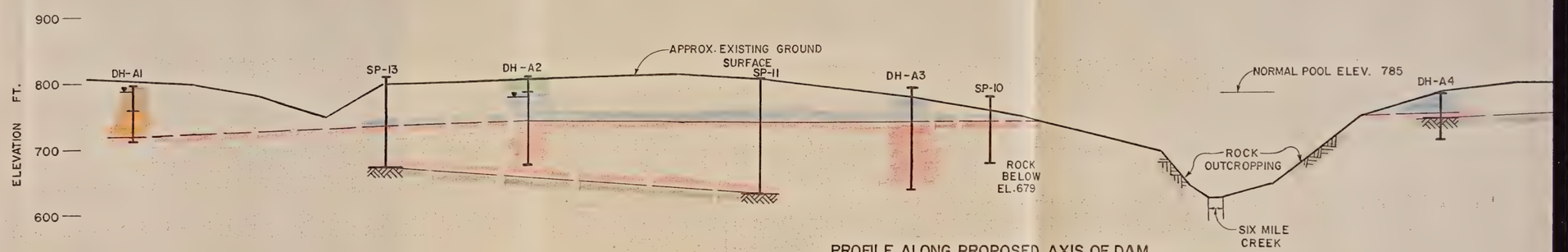
APPROX. SCALE: 1"=400'



SECTION A-A

(BORINGS PROJECTED TO SECTION LINE)

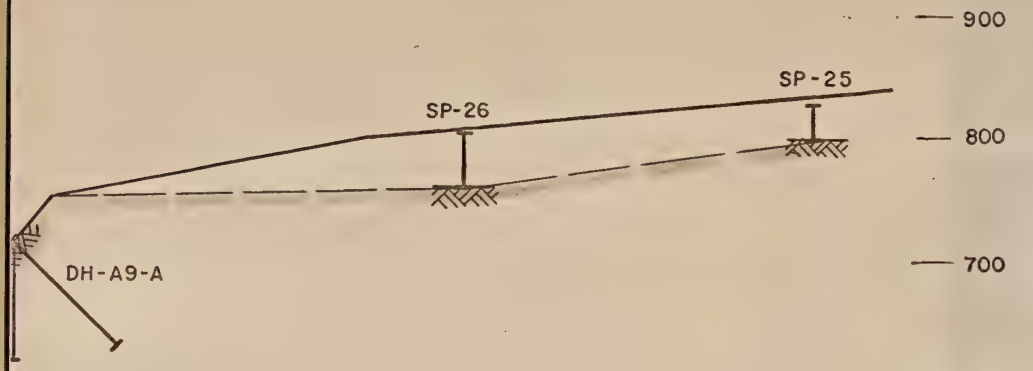
SCALE (VERTICAL & HORIZONTAL): 1"= 100'

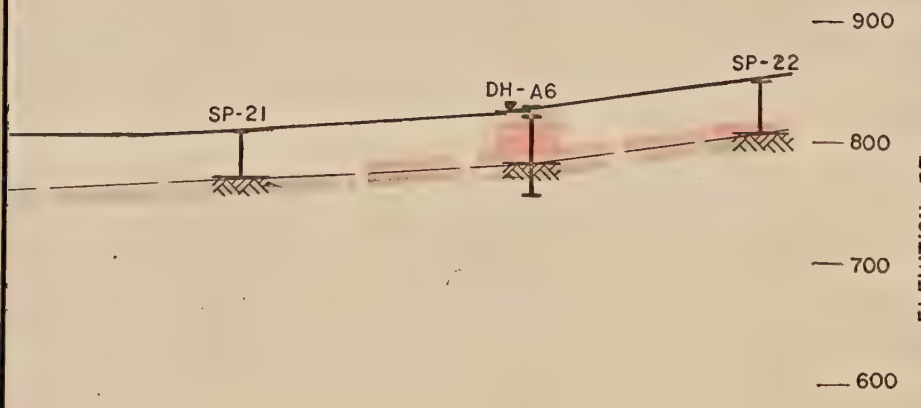


PROFILE ALONG PROPOSED AXIS OF DAM

(BORINGS PROJECTED TO SECTION LINE)

SCALE (VERTICAL & HORIZONTAL): 1"= 100'





PREPARED BY: Gustavus R. Schmoyer

DRAWN BY: Paul A. Rogers

CHECKED BY: Gustavus R. Schmoyer

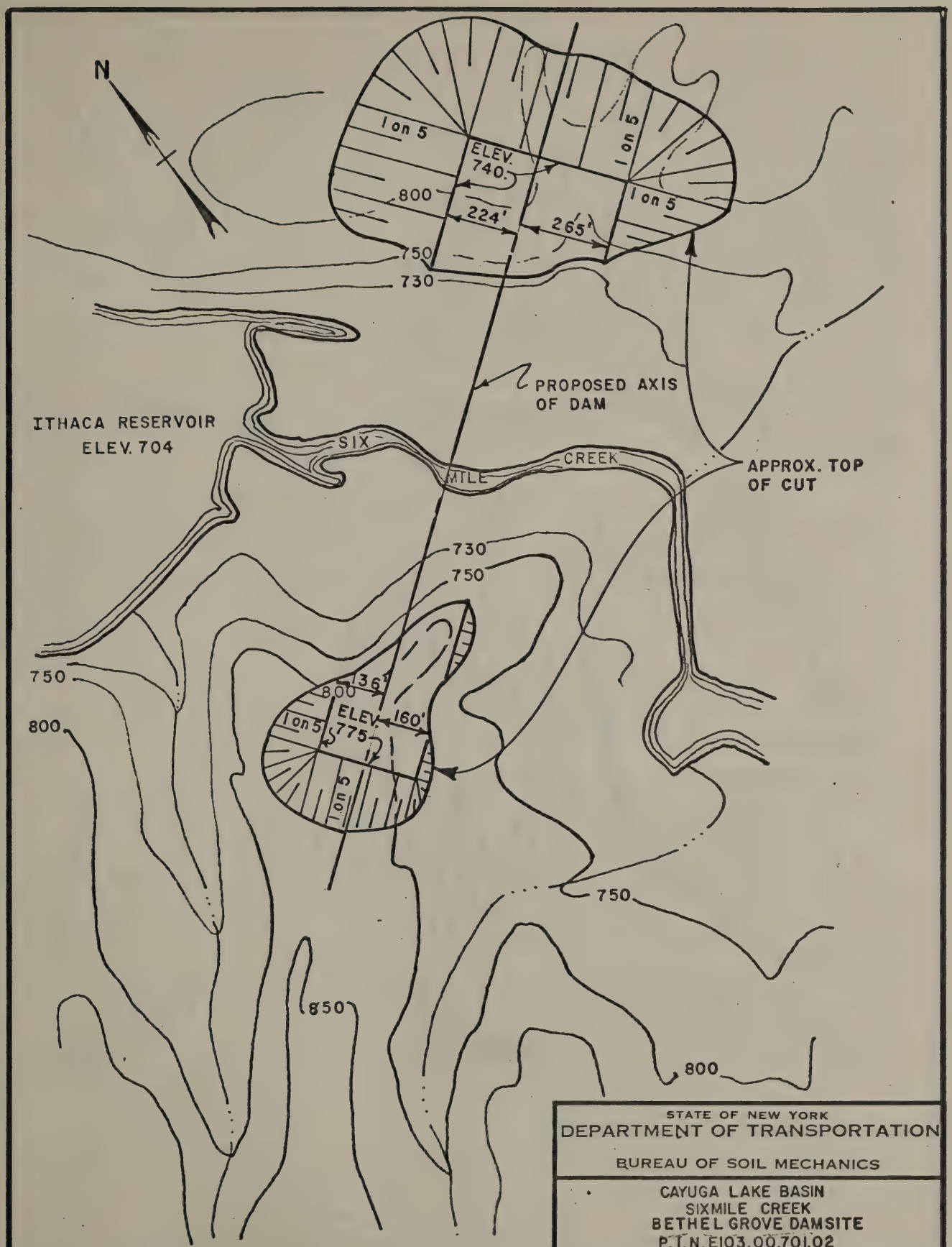
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

CAYUGA LAKE BASIN
SIXMILE CREEK
ALTERNATE DAMSITE
P.I.N. E103.00.701.02

SUBSURFACE PROFILES

APPROVED JULY 13 1973
L. H. Moore Jr.
DIRECTOR

REGION NO. 3
COUNTY TOMPKINS
DRAWING NO. 3 SM 1819 C



PLAN

APPROX. SCALE: 1" = 400

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BUREAU OF SOIL MECHANICS

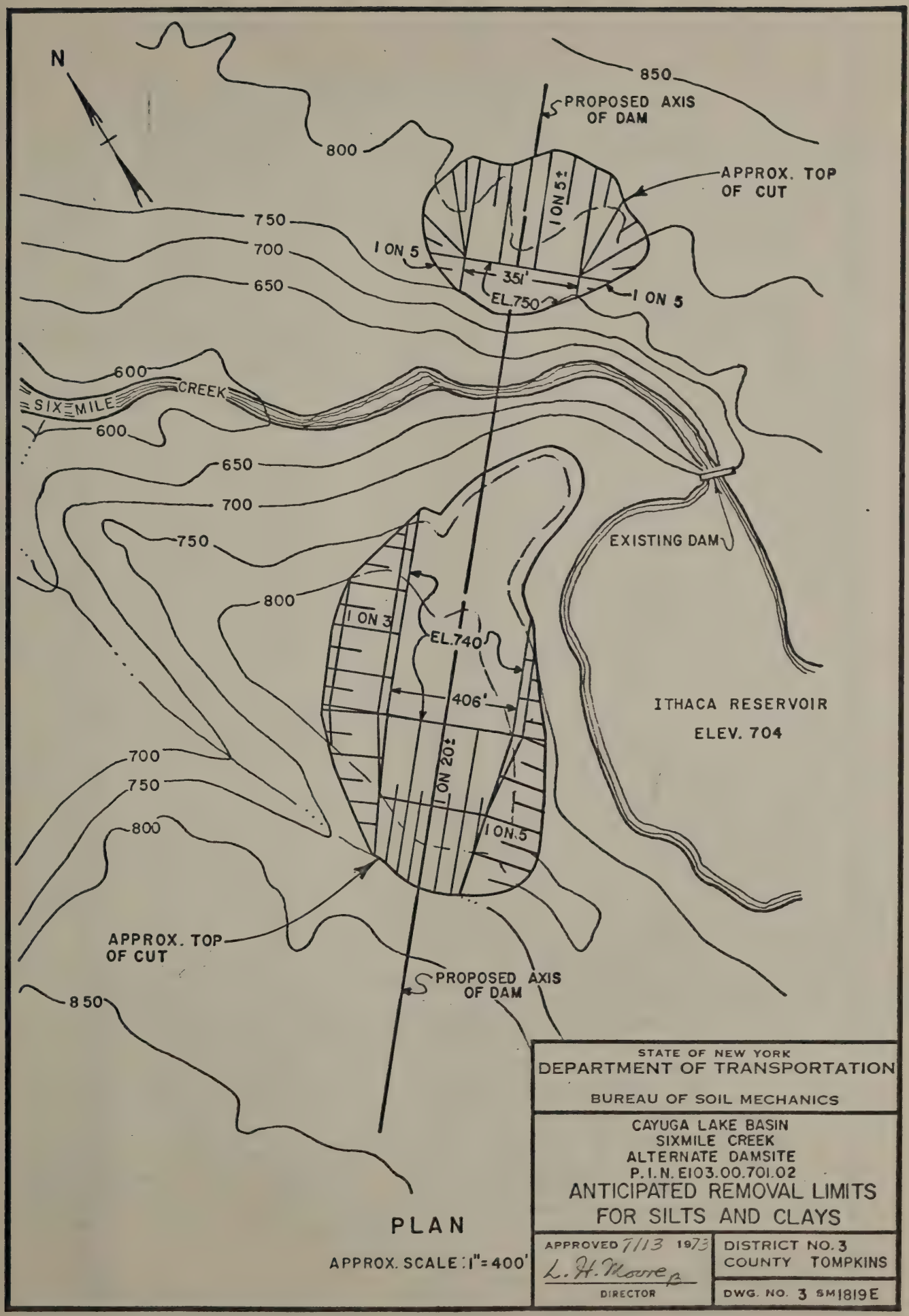
CAYUGA LAKE BASIN
SIXMILE CREEK
BETHEL GROVE DAMSITE
P.T.N. E103.00.701.02

ANTICIPATED REMOVAL LIMITS FOR SILTS AND CLAYS

APPROVED 7/13 1973
L. H. Moore
DIRECTOR

REGION NO. 3
COUNTY TOMPKINS

DWG. NO. 3 SM 1819D



PLAN

APPROX. SCALE: 1" = 400'

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BUREAU OF SOIL MECHANICS

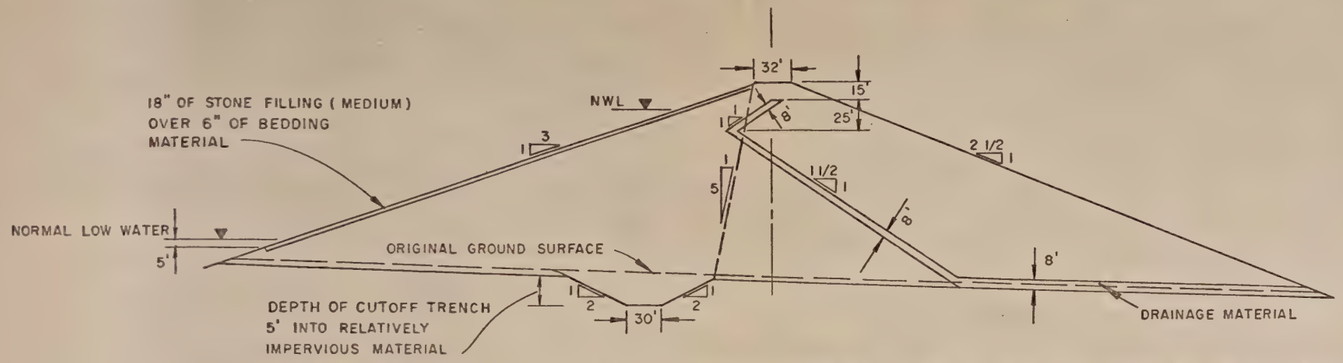
CAYUGA LAKE BASIN
SIXMILE CREEK
ALTERNATE DAMSITE
P.I.N. E103.00.701.02

ANTICIPATED REMOVAL LIMITS FOR SILTS AND CLAYS

APPROVED 7/13 1973
L. H. Moore
DIRECTOR

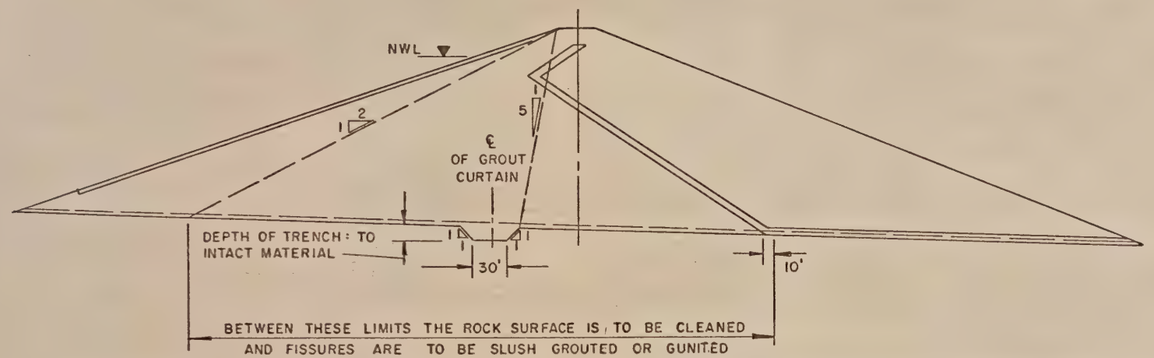
DISTRICT NO. 3
COUNTY TOMPKINS

DWG. NO. 3 SM1819E



TYPICAL CROSS-SECTION OF DAM ON EARTH FOUNDATION

SCALE: 1" = 100'



TYPICAL CROSS-SECTION OF DAM ON ROCK FOUNDATION

SCALE: 1" = 100'

NOTE: MATERIALS, DIMENSIONS AND SLOPES SAME AS FOR DAM ON EARTH FOUNDATION, EXCEPT AS NOTED.

PREPARED BY: Gustavo R. Schnorr
DRAWN BY: F. Agostino
CHECKED BY: Gustavo R. Schnorr

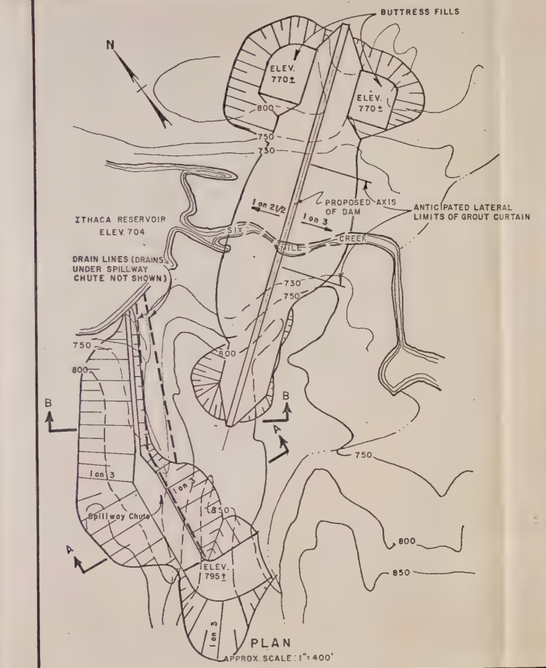
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

CAYUGA LAKE BASIN
SIXMILE CREEK DAMSITES
P.I.N. E103.00-701-02

ASSUMED TYPICAL CROSS SECTIONS FOR EARTH DAM

APPROVED JULY 13 1973
L. H. Moore
DIRECTOR

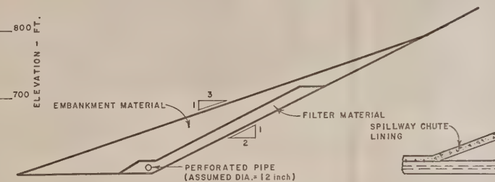
REGION NO. 3
COUNTY TOMPKINS
DRAWING NO. 3 SM 1819 F



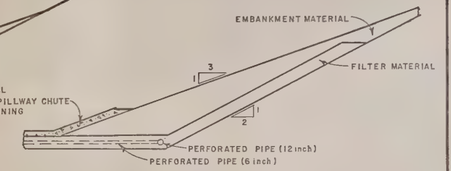
PLAN
APPROX. SCALE: 1" = 400'

SECTION B-B
APPROX. SCALE: 1" = 100'

SECTION B-B
APPROX. SCALE: 1" = 100'



DETAIL 1
APPROX. SCALE: 1" = 20'



DETAIL 2
APPROX. SCALE: 1" = 20'

PREPARED BY: [signature]
DRAWN BY: [signature]
CHECKED BY: [signature]

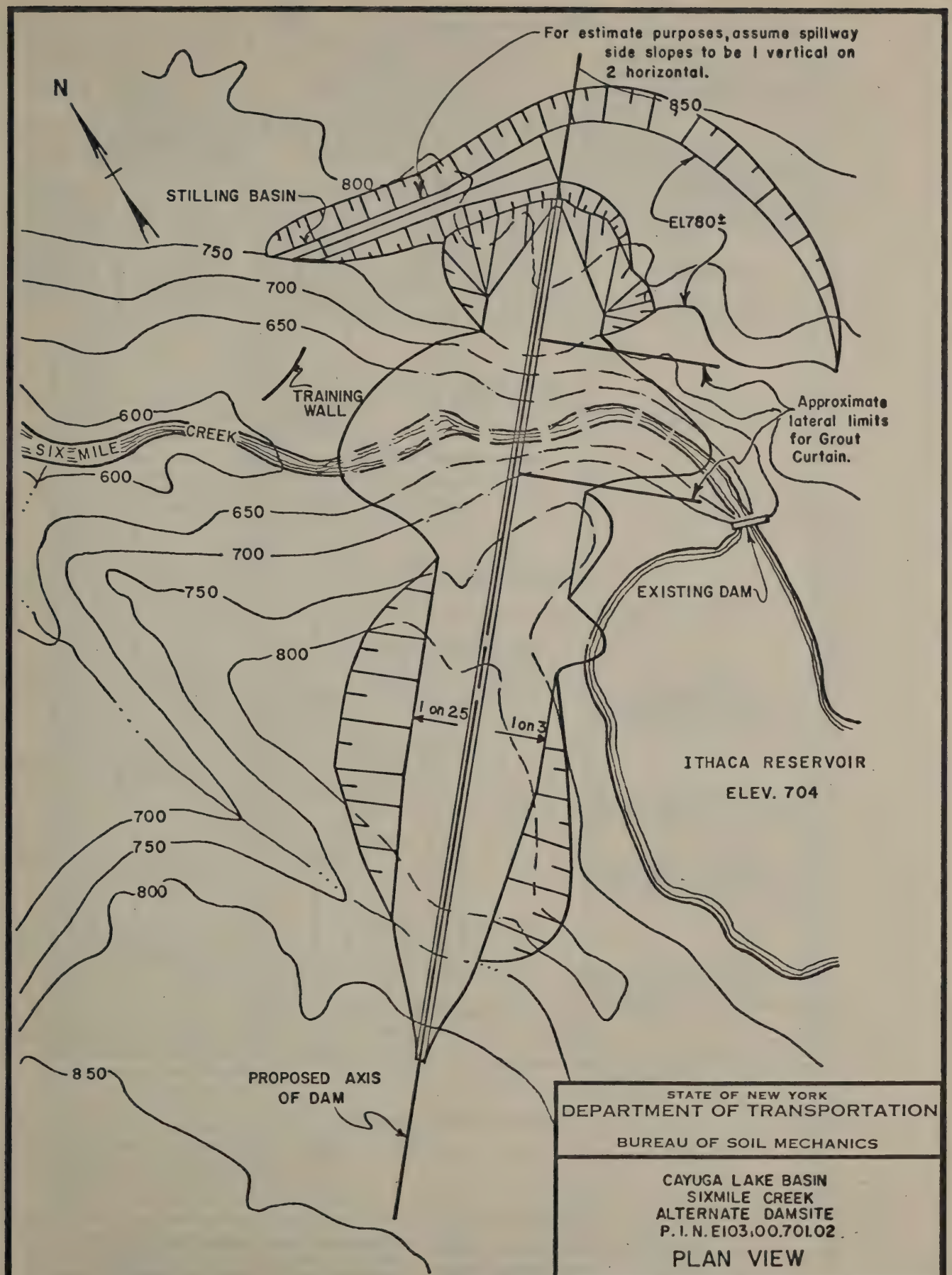
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BUREAU OF SOIL MECHANICS

CAYUGA LAKE BASIN
SIXMILE CREEK
BETHEL GROVE DAMSITE
P.I.N. E103.00.701.02

PLAN VIEW AND
SPILLWAY CROSS-SECTIONS

APPROVED [illegible] 19
DIRECTOR

REGION NO. 3
COUNTY TOMPKINS
DRAWING NO. 3 SM1819G



PLAN

APPROX. SCALE: 1"=400'

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BUREAU OF SOIL MECHANICS

CAYUGA LAKE BASIN
SIXMILE CREEK
ALTERNATE DAMSITE
P.I.N. E103.00.701.02

PLAN VIEW

APPROVED 7/13 1973
L. H. Moore
DIRECTOR

REGION NO. 3
COUNTY TOMPKINS

DWG. NO. 3 SM1819H

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY TOMPKINS
PROJ. NO. E10300-701-02

HOLE NO. A-1
LINE & STA. SEE COORDINATES BELOW
OFFSET

PROJECT CAYUGA LAKE BASIN ~ SIXMILE CREEK DAMSITE
QUAD. LOCATION 75-4-I 17 DATE, START 17 MAY 72 SURF. ELEV. 797.7
SOIL SERIES DUNKIRK DATE, FINISH 19 MAY 72 DEPTH TO WATER -10.0 ft.
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2¾" I.D. 2¼" WEIGHT OF HAMMER 300 lbs HAMMER FALL
SAMPLER O.D. 2" I.D. 1½" INSIDE LENGTH OF SAMPLER 18" CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	N 879,745 E 531,680 REMARKS
0	5										
	21										
	63										
	41										
5	32										
	14	J-1	6	6				M	BR	SILT, some GRAVEL, trace Sand and Clay	5.0'-6.5'
	12				8						
	13										
	19										
10	22										GW
	52	J-2	6	6				W	BR GR	SHALEY GRAVEL and SAND, some Silt, trace Clay	10.0'-11.5'
	61				20						
	60										
	94										
15	113										
	42	J-3	17	20				W	GR	SILT and SHALEY GRAVEL, trace Sand and Clay	15.0'-16.5'
	53				17						
	68										
	140										
20	262										
	110	J-4	14	74				W	GR	GRAVEL and SAND, Some Silt, trace Clay	20.0'-21.5'
	20				80						
	39										HAWTHORNE BIT AHEAD OF CASING 21.5' to 25.0'
	154										
25	287										
	104	J-5	25	30				W	GR	SAND and SILT, some Gravel	25.0'-26.5'
	111				52						
	66										HAWTHORNE BIT AHEAD OF CASING 26.5' to 30.0'
	180									SAND, Some Gravel, trace Silt	
	215										
30	36	J-6	32	100	for 5"			W	GR		30.0'-30'11"
	38										HAWTHORNE BIT AHEAD OF CABING 30'11" to 35.0'
	44										
	80										
35	96									GRAVEL and SAND, trace Silt	
	23	J-7	20	27				W	GR		35.0'-36.5'
	27				30						
	46										HAWTHORNE BIT AHEAD OF CASING 36.5' to 40.0'
	76									MEDIUM SAND, trace Silt	
	58										
40	25	J-8	6	9				W	GR		40.0'-41.5'
	28				11						
	37										HAWTHORNE BIT AHEAD OF CASING 41.5' to 45.0'
	104										
	88									MEDIUM SAND, trace Silt	
45	27	J-9	4	7				W	GR		45.0'-46.5'
	36				9						
	68										
	56										
50	51										

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR J. BLOCK
SOIL DESCRIPTIONS J. SMALL
ROCK DESCRIPTIONS —
DISTRICT SOILS ENGR. J.E. CHRISTOPHER JS

SHEET 1 OF 2. HOLE NO. A-1

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY TOMPKINS
[redacted]. PROJ. NO. E10300.701-02

HOLE NO. A-1
LINE & STA. SEE COORDINATES BELOW
OFFSET

PROJECT CAYUGA LAKE BASIN ~ SIXMILE CREEK DAMSITE
QUAD. LOCATION 75-4-I 17 DATE, START 17 MAY 72 SURF. ELEV. 797.7
SOIL SERIES DUNKIRK DATE, FINISH 19 MAY 72 DEPTH TO WATER -10.0 ft. (ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2 3/4" I.D. 2 1/4" WEIGHT OF HAMMER 300 lbs HAMMER FALL
SAMPLER O.D. 2" I.D. 1 1/2" INSIDE LENGTH OF SAMPLER 18" CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	N 879,745 REMARKS E 531,680
50	32	J-10	5	10				W	GR BR	MED. SAND, trace Silt	50.0'-51.5'
	41				12						
	52										
	74										
	56										
55	21	J-11	7	15				W	GR BR	MEDIUM SAND, trace Silt	55.0'-56.5'
	33				14						
	54										
	61										
	63										
60	39	J-12	5	9				W	GR	MEDIUM SAND, trace Silt	60.0'-61.5'
	45				14						
	59										
	66										
	73										
65	42	J-13	7	10				W	GR	MEDIUM SAND, trace Silt	65.0'-66.5'
	61				14						
	75										
	80										
70	141										
	↑	J-14	12	15				M	GR	MEDIUM SAND, trace Silt	70.0'-71.5'
	NOT CASED				16						
										MED. SAND, trace Silt CHANGING TO CEMENTED GRAVEL and COARSE SAND	HAWTHORNE BIT 71.5' to 75.0'
75	↓	J-15	76	100	for	2"		M	GR		75.0'-75'8"
										BOTTOM OF HOLE	AT 75'8"

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR J. BLOCK
SOIL DESCRIPTIONS J. SMALL
ROCK DESCRIPTIONS —
DISTRICT SOILS ENGR. J.E. CHRISTOPHER JS

SHEET 2 OF 2. HOLE NO. A-1

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted] PROJ. NO. E10,300

HOLE NO. A-4
LINE & STA. ℄ 6+00
OFFSET 810' Rt.

PROJECT Cayuga Lake Basin: Six Mile Creek Damsites
QUAD. LOCATION 75-1-1/4 32 DATE, START 14 June 72 SURF. ELEV. 786.0'
SOIL SERIES Dunkirk DATE, FINISH 28 June 72 DEPTH TO WATER NONE OBSERVED
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75 I.D. 2.25 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL
SAMPLER O.D. 2.00 I.D. 1.50 | INSIDE LENGTH OF SAMPLER 18" | CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
50		J-12	100 = 2"		W	Gry	Decomposed & weat. Shale	"E" Spoon 50.0 ~ 50.1
								Drilled with "AX" Diamond bit 50.1 ~ 55.0'
		C-13	Drilled			Gry	Limey Sandstone	
55								
60								Drilled with "AX" Diamond bit 55.0' ~ 65.0' Rec = 7.5" 2 pcs. + Frags.
65		C-14	Drilled			Gry	Sandstone	
								Drilled with "AX" Diamond bit 65.0' ~ 70.0' Rec. = 5.5"
70		C-15	Drilled				Sandstone	
							Bottom of hole at 70.0'	
75								
80								
85								
90								
95								
100								

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS J.F. DesChambeau
ROCK DESCRIPTIONS G.L. Dawson
DISTRICT SOILS ENGR. J.E. Christopher BLD
SHEET 2 OF 2. HOLE NO. A-4

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. 10300.701

HOLE NO. A-6
LINE & STA. B 4+75
OFFSET 235' Rt.

PROJECT City of Ithaca - Six Mile Creek Damsite
QUAD. LOCATION 75-1-K31 DATE, START 6-5-72 SURF. ELEV. 825.2'
SOIL SERIES Dunkirk DATE, FINISH 6-13-72 DEPTH TO WATER -4.0'
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75 I.D. 2.25 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL
SAMPLER O.D. 2.00 I.D. 1.50 | INSIDE LENGTH OF SAMPLER 18" | CASING 18" SAMPLER 18"

DEPTH IN FT. BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0	2										
	8										
	13										
	28										
	27										G.W
5	6	J-1	2	2				W	BR	Silt, So. Fine Sand, Tr. Gravel	5.0'-6.5'
	4				3						
	17										
	68										
10	140	J-2	100/4"					M	Grey Br.	Silt, Sand & Shaley Gravel	10.0'-10.3'
	2										Drilled with "AX" Diamond Bit:
	17										Rec: 5" 3 pcs.
	58										
	61										
15	41	J-3	Drilled							Assorted Boulders	10.3'-15.0'
	75	J-4	37	44				M	Grey	Silt, Sand & Gravel	15.0'-16.5'
	31				40						Drilled with "AX" Diamond Bit:
	42										Rec: 6" pcs.
	236										
20	205	J-5	Drilled							Assorted Boulders	16.5'-20.0'
	34	J-6	30	26				W	Grey	Silt, Sand & Shaley Gravel	20.0'-21.5'
	28				38						Drilled with "AX" Diamond Bit:
	105										Rec: 5" pcs.
	130										
25	34	J-7	Drilled							Assorted Boulders	21.5'-25.0'
	340	J-8	100/2"					W	Grey	Silt, Shaley Gravel & Sand	25.0'-25.1'
	356										Drilled with "AX" Diamond Bit:
	445										Rec: 4" pcs.
	476										
30	73	J-9	Drilled							Assorted Boulders	25.1'-30.0'
	84	J-10	100/4"					W	Grey	Silt & Shaley Gravel, Tr. Sand	30.0'-30.2'
	126										Drilled with "AX" Diamond Bit:
	582										Rec: 8" pcs.
	701										
35	69	J-11	Drilled							Assorted Boulders	30.2'-35.0'
	81	J-12	100/1½"					W	Grey	Decomposed Shale	35.0'-35.1' "E" Spoon
	128										Drilled with "AX" Diamond Bit:
	118										Rec: 3" pcs.
	183										
40	↑	J-13	Drilled							Assorted Boulders	35.1'-40.0'
		J-14	58	63				W	Grey	Decomp. & Weath. Shale, So. Fine to Med. Gravel	40.0'-41.5' "E" Spoon
					63						Drilled with "AX" Diamond Bit:
											Rec: 6" pcs.
45	Cased	J-15	Drilled							Assorted Boulders	41.5'-45.0'
											Drilled with "AX" Diamond Bit:
											Rec: 18" 16 pcs & chips.
50	↓	C-16	Drilled						Grey	Shale	45.0'-50.0'

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS A. Franke
ROCK DESCRIPTIONS A. Franke
DISTRICT SOILS ENGR. J. Christopher

SHEET 1 OF 2. HOLE NO. A-6

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. 10300-701

HOLE NO. A-6
LINE & STA. ℄ 4+75
OFFSET 235' Rt.

PROJECT CITY OF ITHACA - SIX MILE CREEK DAMSITE
QUAD. LOCATION 15-1-K31 DATE, START 6-5-72 SURF. ELEV. 825.2'
SOIL SERIES DUNKIRK DATE, FINISH 6-13-72 DEPTH TO WATER -4.0'
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75 I.D. 2.25 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL
SAMPLER O.D. 2.00 I.D. 1.50 | INSIDE LENGTH OF SAMPLER 18" | CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER (0/6, 6/12, 12/18, 18/24)	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
50								DRILLED WITH "AX" DIAMOND BIT: REC: 32" 15 pcs. & chps.
55		C-17	DRILLED			Grn	SHALE	50.0'-55.0'
	Not Cased							DRILLED WITH "AX" DIAMOND BIT: REC: 10" 6 pcs. & chps.
60		C-18	DRILLED			Grn	SHALE	55.0'-60.0'
								DRILLED WITH "AX" DIAMOND BIT: REC: 3.5" 6 pcs.
65		C-19	DRILLED			Grn	SHALE	60.0'-65.0'
								DRILLED WITH "AX" DIAMOND BIT: REC: 4" pcs. "E" Spoon
70		C-20	DRILLED			Grn	SHALE	65.0'-70.0' REFUSAL
							BOTTOM OF HOLE @ 70.0'	

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DRILL RIG OPERATOR J. BLOCK
SOIL DESCRIPTIONS A. FRANKE
ROCK DESCRIPTIONS A. FRANKE
DISTRICT SOILS ENGR. J. CHRISTOPHER JC

SHEET 2 OF 2. HOLE NO. A-6

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted] PROJ. NO. E10300

HOLE NO. A-9
LINE & STA. [illegible] Bk. Tan. Ext. 163+82
OFFSET 84' Lt.

PROJECT Cayuga Lake Basin Six Mile Creek Damsite
QUAD. LOCATION 75-1-K32
SOIL SERIES Dunkirk

DATE, START July 10, 1972
DATE, FINISH July 19, 1972

SURF. ELEV. 709.6'
DEPTH TO WATER None observed
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4.25" I.D. 3.25"
SAMPLER O.D. 3.50" I.D. 3.00

WEIGHT OF HAMMER 300 lbs
INSIDE LENGTH OF SAMPLER 18"

HAMMER FALL
CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER (0/6, 6/12, 12/18, 18/24)	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0								Drilled With Roller Bit Lost Wash Water @ 40' Spoon Refused @ 50' 0~5.0'
5								Drilled With NX Diamond Bit
10		C-1	Drilled			Gry	Limey Shale	Recovery 60" 5.0'~10.0' 15 Pieces + Frags
								Drilled With NX Diamond Bit & 10' Double Tube Barrel
15		C-2	Drilled			Gry	Limey Shale	Recovery 62" 10.0'~15.0' 24 Pieces + Frags
								Drilled With NX Double Tube Barrel
20								
25		C-3	Drilled			Gry	Shale	Recovery 114.0" 31 Pieces + Frags 15.0'~25.0'
								Drilled With NX Double Tube Barrel
30								
35		C-4	Drilled			Gry	Limey Shale	Recovery 120" 19 Pieces + Frags 25.0'~35.0'
								Drilled With NX Double Tube Barrel
40								
45		C-5	Drilled			Gry	Shale	Recovery 116" 11 Pieces + Frags 35.0'~45.0'
50								

Drilled Not Cased

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS J. Des Chambeau
ROCK DESCRIPTIONS J. Des Chambeau
DISTRICT SOILS ENGR. J. Christopher

SHEET 1 OF 2. HOLE NO. A-9

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
B.S.M. PROJ. NO. E10,300

HOLE NO. A-9
LINE & STA. @ Bk Tan Ext 163+82
OFFSET 84'4

PROJECT Cayuga Lake Basin: Sixmile Creek Demsite
QUAD. LOCATION 75-1-K32 DATE, START 7/10/72 SURF. ELEV. 709.6'
SOIL SERIES Dunkirk DATE, FINISH 7/19/72 DEPTH TO WATER NONE OBSERVED (ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4.25" I.D. 3.25" WEIGHT OF HAMMER 300 lbs HAMMER FALL
SAMPLER O.D. 3.50" I.D. 3.00 INSIDE LENGTH OF SAMPLER 18" CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
50								Drilled With NX Diamond Bit
	Drilled Not Cased	C-6	Drilled			Gry	Shale	Recovery 68" 9 Pieces + Frags 45.0'~55.0'
55		C-7	Drilled			Gry	Shale	Drilled With NX Diamond Bit Some Core From Previous Run Was Picked up In This Run. Recovery 75" 13 Pieces 55.0'~60.0'
60								Drilled With NX Diamond Bit Some Core From Previous Run was picked up in this Run. Recovery 122.0" 9 Pieces
65		C-8	Drilled			Gry	Shale & Limey Shale	60.0'~68.0'
70								Drilled With NX Diamond Bit
75								Recovery 104" 9 Pieces
		C-9	Drilled			Gry	Shale & Limey Shale	68.0'~78.0'
80								Drilled With NX Diamond Bit
85								Recovery 120" 7 Pieces + Frags
		C-10	Drilled			Gry	Shale	78.0'~88.0'
90								Drilled With NX Diamond Bit
95								Recovery 115" 9 Pieces + Frags
		C-11	Drilled			Gry	Shale	88.0'~98.0'
100							Bottom of Hole @ 98.0'	

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DRILL RIG OPERATOR J. Black
SOIL DESCRIPTIONS —
ROCK DESCRIPTIONS J. DesChambeau
DISTRICT SOILS ENGR. J. Christopher

SHEET 2 OF 2. HOLE NO. A-9

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. E10300

HOLE NO. A-9A
LINE & STA. 163+82 Bk. Tan. Ext. Ah.
OFFSET 84' Lt

PROJECT Cayuga Lake Basin, Six-Mile Creek Damsite
QUAD. LOCATION 75-1-K32 DATE, START 21 Jul 72 SURF. ELEV. 709.6
SOIL SERIES Dunkirk DATE, FINISH 16 Aug 72 DEPTH TO WATER None Observed
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 3½" I.D. 3" | WEIGHT OF HAMMER None | HAMMER FALL CASING — SAMPLER —
SAMPLER O.D. None I.D. — | INSIDE LENGTH OF SAMPLER —

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/5	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0											Drilled with Quarry Bit and "NX" Flush Coupled Casing 0.0'~4.8' No Recovery
5											
10		C-1							Gry	SHALE Cores	Drilled with "NX" Diamond Bit 4.8'~10.0' Recovery = 26" 6 Pieces + Chips
15		C-2							Gry	SHALE Cores	Drilled with "NX" Diamond Bit 10.0'~15.0' Recovery = 27" 4 Pieces + Chips
20		C-3							Gry	Shale with Boulder Cores	Drilled with "NX" Diamond Bit 15.0'~20.0' Recovery = 46" 10 Pieces + Chips
25		C-4							Gry	Badly Fractured SHALE Cores	Drilled with "NX" Diamond Bit 20.0'~25.0' Recovery = 19" 7 Pieces + Chips
30		C-5							Gry	Badly Fractured SHALE Cores	Drilled with "NX" Diamond Bit 25.0'~30.0' Recovery = 33" 8 Pieces + Chips
35		C-6							Gry	SHALE Cores	Drilled with "NX" Diamond Bit 30.0'~35.0' Recovery = 74" 5 Pieces + Chips
40		C-7							Gry	SHALE Cores	Drilled with "NX" Diamond Bit 35.0'~40.0' Recovery = 63" 11 Pieces + Chips
45		C-8							Gry	SHALE Cores with Limey Shale seams	Drilled with "NX" Diamond Bit 40.0'~45.0' Recovery = 57" 10 Pieces + Chips
50		C-9							Gry	Limey SHALE Cores	Drilled with "NX" Diamond Bit 45.0'~50.0' Recovery = 36" 9 Pieces + Chips

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS —
ROCK DESCRIPTIONS D.B. Jenkins
DISTRICT SOILS ENGR. J.E. Christopher O.J.

SHEET 1 OF 3. HOLE NO. A-9A

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. F107300

HOLE NO. A-9A
LINE & STA. 163+82 ℄ Bk. Tan. Ext. Ab.
OFFSET 84' Lt

PROJECT Cayuga Lake Basin, Six-Mile Creek Damsite
QUAD. LOCATION 75-1-K 32 DATE, START 21 Jul 72 SURF. ELEV. 709.6
SOIL SERIES Dunkirk DATE, FINISH 16 Aug 72 DEPTH TO WATER Observed
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 3 ½" I.D. 3" | WEIGHT OF HAMMER — | HAMMER FALL CASING — SAMPLER —
SAMPLER O.D. None I.D. — | INSIDE LENGTH OF SAMPLER —

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
50								Drilled with "NX" Diamond Bit 50.0' to 55.0' Recovery = 40" 4 Pieces + Chips
55		C-10				Gry	SHALE Cores	Drilled with "NX" Diamond Bit 55.0'-60.0' Recovery = 60" 6 Pieces
60		C-11				Gry	SHALE Cores	Drilled with "NX" Diamond Bit 60.0'-65.0' Recovery = 58" 4 Pieces
65		C-12				Gry	SHALE Cores	Drilled with "NX" Diamond Bit 65.0'-70.0' Recovery = 46" 13 Pieces + Chips
70		C-13				Gry	SHALE Cores	Drilled with "NX" Diamond Bit 70.0'-75.0' Recovery = 59" 8 Pieces
75		C-14				Gry	SHALE Cores with Limey Shale Seams	Drilled with "NX" Diamond Bit 75.0'-80.0' Recovery = 60" 2 Pieces
80		C-15				Gry	SHALE Cores	Drilled with "NX" Diamond Bit 80.0'-85.0' Recovery = 60" 5 Pieces
85		C-16				Gry	SHALE Cores	Drilled with "NX" Diamond Bit 85.0'-90.0' Recovery = 52" 6 Pieces
90		C-17				Gry	SHALE Cores	Drilled with "NX" Diamond Bit 90.0'-95.0' Recovery = 63" 5 Pieces
95		C-18				Gry	SHALE Cores	Drilled with "NX" Diamond Bit 95.0'-100.0' Recovery = 60" 5 Pieces
100		C-19				Gry	SHALE Cores	

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS —
ROCK DESCRIPTIONS D. B. Jenkins
DISTRICT SOILS ENGR. J. E. Christopher D.J.

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
PROJ. NO. E10300

HOLE NO. A-9A
LINE & STA. 163+82 Bk. Tan. Ext. Ab.
OFFSET 84' Lt

PROJECT Cayuga Lake Basin, Six-Mile Creek Damsite
QUAD. LOCATION 75-1-K32 DATE, START 21 Jul 72 SURF. ELEV. 709.6
SOIL SERIES Dunkirk DATE, FINISH 16 Aug 72 DEPTH TO WATER None observed
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 3 1/2" I.D. 3" | WEIGHT OF HAMMER None | HAMMER FALL CASING — SAMPLER —
SAMPLER O.D. None I.D. — | INSIDE LENGTH OF SAMPLER —

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
100								Drilled with "NX" Diamond Bit 100.0'-105.0' Recovery = 62" 5 Pieces
105		C-20				Gry	SHALE Cores	
								Drilled with "NX" Diamond Bit 105.0'-110.0' Recovery = 57" 5 Pieces
110		C-21				Gry	SHALE Cores	
								Drilled with "NX" Diamond Bit 110.0'-115.0' Recovery = 50" 8 Pieces
115		C-22				Gry	SHALE Cores	
		C-23				Gry	SHALE Cores	Drilled with "NX" Diamond Bit 115.0'-117.5' Recovery = 28" 1 Piece
							Bottom of Hole @ 117.5'	
120								
125							Note: Intermittent Loss of Wash Water from 10' to 19'. Lost Wash Water at 19'	
							This Boring was drilled at a 45° Angle adjacent to DH # A-9.	
130								
135								
140								
145								
150								

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS —
ROCK DESCRIPTIONS D. B. Jenkins
DISTRICT SOILS ENGR. J. E. Christopher D.J.
SHEET 3 OF 3. HOLE NO. A-9A

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. 10300

HOLE NO. B-1
LINE & STA. ℄ 89+73
OFFSET 36' Rt.

PROJECT Cayuga Lake Basin – 6 Mile Creek Damsite
QUAD. LOCATION 75-4-4, 4 DATE, START 5-23-72 SURF. ELEV. 861.8
SOIL SERIES Dunkirk DATE, FINISH 5-31-72 DEPTH TO WATER None observed
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75 I.D. 2.25 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL
SAMPLER O.D. 2.00 I.D. 1.52 | INSIDE LENGTH OF SAMPLER 18" | CASING 18" SAMPLER 18"

DEPTH IN FT. BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0	6										
	8										
	14										
	17										
	22										
5	19	J-1	5	8				M	BR.	SILT, TR. CLAY & GRAVEL	5.0'–6.5'
	25				10						
	36										
	43										
	47									VARVED SILT, SO. SAND	
10	27	J-2	6	6				W	BR.	TR. CLAY & GRAVEL	10.0'–11.5'
	34				4						
	88										
	62										
	66										
15	57	J-3	10	11				W	BR.	SILT, SO. SAND & GRAVEL	15.0'–16.5'
	116				18						
	93										
	79										
	47										
20	35	J-4	6	8				W	BR.	SILT, SO. FINE SAND	20.0'–21.5'
	52				11						
	63										
	126										
	77										
25	49	J-5	6	9						SILT, SOME FINE SAND,	
	71				14			W	BR.	TR. CLAY	26.0'–26.5'
	77										
	120										
	109										
30	59	J-6	6	10						SILT, TR. FINE SAND	
	72				12			W	GRY	& CLAY	30.0'–31.5'
	112										
	145										
	146										
35	84	J-7	12	14				W	BR.	DEUSE SILT, TR. CLAY	35.0'–36.5'
	157				15						
	135										
	152										
	228										
40	185	J-8	12	16				W	BR.	SILT, TR. CLAY	40.0'–41.5'
	440				22						
	531										
	692										
	870										
45	212	J-9	6	11						LAYERED SILT & FINE	
	296				16			W	GRY	SAND	45.0'–46.5'
	318										
	391										
50	408										

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS A. Franke
ROCK DESCRIPTIONS A. Franke
DISTRICT SOILS ENGR. J. Christopher

SHEET 1 OF 2. HOLE NO. B-1

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. 10300

HOLE NO. B-1
LINE & STA. B 89+73
OFFSET 36' Rt

PROJECT Cayuga Lake Basin - 6 Mile Creek Damsite
QUAD. LOCATION 75/4/K/4 DATE, START 5-23-72 SURF. ELEV. 861.8
SOIL SERIES Dunkirk DATE, FINISH 5-31-72 DEPTH TO WATER None observed
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2:75 I.D. 2:25 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL
SAMPLER O.D. 2:00 I.D. 1:50 | INSIDE LENGTH OF SAMPLER 18" | CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
50	126	J-10	8	12				W	BR	VARVED SILT, TR. CLAY	50.0'-51.5'
	180				16						
	202										
	241										
	279										
55	118	J-11	6	10				W	BR. GRN.	SILT, TR. CLAY, SAND & GRAVEL	55.0'-56.5'
	131				31						
	177										
	198										
	207										
60	96	J-12	9	20				W	GRY	SILT, TR. CLAY & GRAVEL	60.0'-61.5'
	147				29						
	163										
	190										
	227										
65	101	J-13	10	13				W	GRY	MOTTLED SILT, TR. CLAY, GRAVEL & SAND	65.0'-66.5'
	160				18						
	192										
	211										
	280										
70	NOT CASED	J-14	42	51				M	GRY	SILT, TR. CLAY & GRAVEL	70.0'-71.5'
					58						DRILLED WITH HAWTHORNE BIT: 71.5'-75.0'
75		J-15	29	53				M	GRY.	SILT, TR. CLAY	75.0'-76.5'
					71					BOTTOM OF HOLE @	76.5'

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR J. BLOCK
SOIL DESCRIPTIONS A. FRANKE
ROCK DESCRIPTIONS —
DISTRICT SOILS ENGR. J. CHRISTOPHER
SHEET 2 OF 2. HOLE NO. B-1

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. E10,300

HOLE NO. B-3
[redacted]. Co-ordinates
N877,665 E533,430
[redacted]

PROJECT Cayuga Lake Basin - Sixmile Creek Damsites
QUAD. LOCATION ~~[illegible]~~ DATE, START 10/21/71 SURF. ELEV. 735.9'
SOIL SERIES Dunkirk DATE, FINISH 10/27/71 DEPTH TO WATER -2.0 ft.
(ALSO DESCRIBE UNDER "REMARKS")

75/4/K3"

CASING O.D. 2.75" I.D. 2.25" WEIGHT OF HAMMER 300 lbs HAMMER FALL
SAMPLER O.D. 2.00" I.D. 1.50" INSIDE LENGTH OF SAMPLER 18" CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0											Used 4" Casing 0'~2.5' Used 2½" Casing 25'~28.3'
	2										Drilled 0'~5' with 5⅝" Roller Bit.
	5										
	17										
	76										
5'	179										
	25	J-1	26	33				M	Gry	Silt, Trace of Fine Sand and Fine Shaley Gravel	5.0'~6.5'
	61				26						Drilled 5'~10' with 5⅝" Roller Bit.
	87										
	162										
10'	429										
	48	J-2	58	100=2"				M	Gry	Silt, Trace of Fine Sand and Fine Shaley Gravel	10.0'~10.7'
	68										Drilled 10.7'~15.0' With Carbide Quarry Bit.
	98										
	328										
15'	205							M	Gry	Silt, Trace of Fine Sand and Weathered Shale Pieces	15.0'~15.4'
	129	J-3	100=3"								Drilled 15.0'~20.0' With Carbide Quarry Bit.
	101										
	84										
	191										
20'	490										
	1100	J-4	16	100=6"				M	Gry	Layered Silt and Fine Sand Some Weathered Shale Pieces	20.0'~21.0'
	192										Drilled 20.0'~23.5' With Carbide Quarry Bit (Jar Sample)
	160										Drilled With "NX" Diamond Bit 23.5'~25.0'
	301										
25'	405	C-5	Drilled						Gry	Limey Shale Boulders	23.5'~25.0' Recovery 8"
	28	J-6	16	32				M	Gry	Angular Gravel Pieces	25.0'~26.5'
	112				64						Drilled With "AX" Diamond Bit Recovery 17.6" 13 Pieces
	166										
	72.7~4"										
30'		C-7	Drilled						Gry	Shale	28.3'~30.0'
											Drilled With "AX" Diamond Bit Recovery 54" Pieces
35'		C-8	Drilled						Gry	Shale	30.0'~35.0'
											Drilled With "AX" Diamond Bit 56" Recovery 39 Pieces
40'		C-9	Drilled						Gry	Shale	35.0'~40.0'
											Drilled With "AX" Diamond Bit 56" Recovery 40 Pieces
45'		C-10	Drilled						Gry	Shale	40.0'~45.0'
											Drilled With "AX" Diamond Bit Recovery 57" 42 Pieces
50'		C-11	Drilled						Gry	Shale	45.0'~50.0'

Drilled Not Cased

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS J. Des Chambeau
ROCK DESCRIPTIONS J. Des Chambeau
DISTRICT SOILS ENGR. J. Christopher

SHEET 1 OF 1. HOLE NO. B-3

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. 10300

HOLE NO. B-4
LINE & STA. "N" 678,000
OFFSET "E" 539,960

PROJECT Cayuga Lake Basin - 6 Mile Creek Damsite
QUAD. LOCATION 76-4-K.3 DATE, START 3/13/72 SURF. ELEV. 822.6
SOIL SERIES Dunkirk DATE, FINISH 4/18/72 DEPTH TO WATER None Observed
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4.25 I.D. 3.75 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL CASING 18" SAMPLER 18"
SAMPLER O.D. 3.50 I.D. 3.00 | INSIDE LENGTH OF SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0	6										
	7										
	13										
	23										
5	31										
	73	J-1	4	8							
	90				15			M	Grey Br.	Silt, Tr. Sand, Clay & Fine Gravel	6.0'-6.5'
	142										
	190										
10	154										
	380	J-2	12	16						Silt & Sand, So. Fine	
	500				23			W	Br.	Gravel, Tr. Clay & Organics	10.0'-11.5'
	280										
	300										
15	303										
	240	J-3	2	3					Grey Br.		
	280				5			W		Silt, Tr. Clay & Sand	15.0'-16.5'
	280										
	330										
	243								Br.		
20	395	J-4	4	6				W	Grey	Silt, Tr. Clay & Sand	20.0'-21.5'
	400				6						
	355										
	335										
	295										
25	260	J-5	1	2							
	207				5			W	Grey	Silt, Tr. Clay	25.0'-26.5'
	200										
	215										
30	200										
	230	J-6	2	2					Grey Br.		
	215				3			W		Silt, Tr. Clay	30.0'-31.5'
	220										
	218										
35	228									Silt, So. Clay, Tr.	
	150	J-7	2	2				W	Grey	Gravel & Sand	35.0'-36.5'
	300				3						
	251										
	243										
40	200										
	228	J-8	3	3						Silt, So Sand, Tr.	
	315				4			W	Br.	Gravel & Clay	40.0'-41.5'
										Silt & Clay to Silt,	
45										So. Sand, Tr. Gravel	
	Split Spoon	J-9	2	6				W	Grey	& Clay (Till)	45.0'-46.5' "A" Spoon
					18						
50											

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS A. Franke
ROCK DESCRIPTIONS —
DISTRICT SOILS ENGR. J. Christopher

SHEET 1 OF 2. HOLE NO. B-4

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. 10300

HOLE NO. B-4
LINE & STA. "N" 878,000
OFFSET "E" 533,960

PROJECT Cayuga Lake Basin - 6 Mile Creek Damsite
QUAD. LOCATION 75-4-K3 DATE, START 3-13-72 SURF. ELEV. 822.6
SOIL SERIES Dunkirk DATE, FINISH 4-18-72 DEPTH TO WATER None Observed
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4:25 I.D. 3:75 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL
SAMPLER O.D. 3:50 I.D. 3:00 | INSIDE LENGTH OF SAMPLER 18" | CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
50	Not Cased	J-10	56	100/4"				M	Gry	Gravel, sand & silt, tr. clay (gravely till)	"Ax" spoon 50.0'-50.9'
										No sample	Drilled with quarry bit: 50.9' - 55.0' "Ax" spoon refused @ 55.0'
55											
60											Drilled with "NX" diamond bit: Rec: 6" 5 pcs.
65		J-11	Drilled							Boulders	55.0'-65.0'
70											Drilled with "NX" diamond bit: Rec: 3" 4 pcs.
75		J-12	Drilled							Boulders	65.0'-75.0'
		J-13	52	100/3"				W	Br. Gry	Fine to med. gravel, so. sand & silt	75.0'-75.8'
										Bottom of hole @ 75.8'	

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS A. Franke
ROCK DESCRIPTIONS —
DISTRICT SOILS ENGR. J. Christopher
SHEET 2 OF 2. HOLE NO. B-4

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY TOMPKINS
~~FED.~~ PROJ. NO. E10300

HOLE NO. B-5
LINE & STA. SEE REMARKS for DH Location
OFFSET

PROJECT CAYUGA LAKE BASIN: SIXMILE CREEK DAMSITES (BETHEL GROVE)
QUAD. LOCATION ~~75-4 SE 1/2~~ 75/A/L3 DATE, START 22 SEP 71 SURF. ELEV. 719.9
SOIL SERIES DUNKIRK DATE, FINISH 12 OCT 71 DEPTH TO WATER -4.0 ft.
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4¼" I.D. 3¾" WEIGHT OF HAMMER 300 lbs HAMMER FALL "
SAMPLER O.D. 2" I.D. 1⅜" INSIDE LENGTH OF SAMPLER 18" CASING 18 SAMPLER 18

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	GRID LOCATION from USGS SHEETS: REMARKS N 878,290 E 534,245
0	16										
	200	C-1	DRILLED							BOULDER CORES 9½" REC. 1 pc.	NX DIAMOND BIT 1.0' to 3.0'
	26										
	53	C-2	DRILLED							BOULDER CORES 8½" REC. 5 pcs.	NX DIAMOND BIT 3.0' to 5.0'
	79										
5	3	J-3	9	17				W	BR	MEDIUM SAND, some Silt and Gravel	5.0' - 6.5'
	8				13						
	30										Hawthorne Bit ahead of casing 6.5' - 10.0'
	196									SHALEY GRAVEL, trace Silt and Clay	
	312										
10	91	J-4	14	16				W	GR		10.0' - 11.5'
	437				20						Hawthorne refused 11.5'
	417										NK DIAMOND BIT 11.5' to 15.0'
	522	C-5	DRILLED							BOULDER CORES 6" REC. 6 pcs. + chips	BOULDER BUSTER to 15.0'
	871										
15	62	J-6	21	32				W	BR	SHALEY GRAVEL, some Sand and Silt	15.0' - 16.5'
	73				46						
	102										Hawthorne Bit ahead of casing 16.5' - 20.0'
	133									SHALEY GRAVEL, trace Silt	
	139										
20	72	J-7	4	13				W	BR		20.0' - 21.5'
	80				26						
	96										Hawthorne Bit ahead of casing 21.5' - 25.0'
	210									SHALEY GRAVEL, trace Sand and Silt	
	270										
25	95	J-8	8	23				W	BR		25.0' - 26.5'
	104				53						
	116										Hawthorne Bit ahead of casing 26.5' - 30.0'
	132									SHALEY GRAVEL, trace Sand and Silt	
	158										
30	140	J-9	9	17				W	BR		30.0' - 31.5'
	345				23						
	672										Hawthorne Bit ahead of casing 31.5' - 35.0'
	833									SHALEY GRAVEL and SAND, trace Silt	
	1000										
35	456	J-10	12	21				W	BR		35.0' - 36.5'
	152				32						
	186										Roller Bit 36.5' - 40.0' ahead of casing. Boiled in 3.5' at 40.0'
	170									FINE GRAVEL and SHALEY GRAVEL, trace Sand	
	261										
40	232	J-11	WASH								40.0' - 41.5'
	208		SAMPLE								
	333										Roller Bit ahead of casing 41.5' to 45.0'
	266									SHALEY GRAVEL and FINE GRAVEL, some Sand, trace Silt and Clay	
	290										
45	298	J-12	100	87							45.0' - 46.5'
	168				65						
	300										Roller Bit ahead of casing 46.5' to 50.0'
	275										
50	450										

GW

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR J. BLACK
SOIL DESCRIPTIONS J. SMALL
ROCK DESCRIPTIONS J. SMALL
DISTRICT SOILS ENGR. J. CHRISTOPHER JR

SHEET 1 OF 3. HOLE NO. B-5

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY TOMPKINS
[redacted]. PROJ. NO. E10300

HOLE NO. B-5
LINE & STA. SEE REMARKS for DH Location
OFFSET

PROJECT CAYUGA LAKE BASIN: SIXMILE CREEK DAMSITES (BETHEL GROVE)
QUAD. LOCATION ~~75-4-[illegible]~~ DATE, START 22 SEP 71 SURF. ELEV. 719.9
SOIL SERIES DUNKIRK 75/4/L3 DATE, FINISH 12 OCT 71 DEPTH TO WATER -4.0 ft.
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4¼" I.D. 3¾" WEIGHT OF HAMMER 300 lbs HAMMER FALL
SAMPLER O.D. 2" I.D. 1½" INSIDE LENGTH OF SAMPLER 18" CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	GRID LOCATION from USGS sheets: REMARKS N 878,290 E 534,245
50	380	J-13	19	33						SHALEY GRAVEL and GRAVEL,	
	245				52			M	BR	trace Sand and Silt	50.0'-51.5'
	380										
	281									SHALEY GRAVEL, some	
	362									Sand, trace Silt	
55	300	J-14	100	for	3"			W	BR		55.0'-55'3"
	265										
	621									SHALE and SANDSTONE	NX DIAMOND BIT
	397	C-15	DRILLED							BOULDER CORES	55'3" to 60.0'
	325									4" REC. 3 pcs	
60	376	J-16	16	30						SHALEY GRAVEL, some	
	396				64			M	BR	Sand, trace Silt	60.0'-61.5'
	310										
	329									GRAVEL, some Sand,	
	274									trace Silt and Clay	
65	248	J-17	10	25							
	283				53			W	BR		65.0'-66.5'
	240										
	237										REFUSAL
70	415										NX DIAMOND BIT
	328										69.5' to 74.5'
	450	C-18	DRILLED							BOULDER CORES	
	476										BOILED UP 5.0' in
	413									22" REC. 9 pcs.	casing after coring
	283										
75	300										
	400										BOILED UP 5.0' in
	1650									FINE SHALEY GRAVEL	casing after cleanout
	1365									and SAND	to 80.0'
	1300	J-19	WASH SAMPLE					W	GR		80.0'
80	488										
	1148										
	1986										
	3004									CHANGED FROM 4" CASING to 2½" CASING	
	680										
85	51									AT 85.0 ft.	
	100										
	126										
	148									SHALEY GRAVEL and	
	184									Silt, some Sand,	
90	67	J-20	49	39							
	64				31			M	GR	trace Clay	90.0'-91.5'
	165										Hawthorne Bit ahead
	807										of casing 91.5' to 95.0'
											"E" Spoon refused at 95.0'
95											
	No Casing used	C-21	DRILLED							SHALE ROCK CORES	AX DIAMOND BIT
											95.0' to 99.0'
									GR	47" REC. 27 pcs.	
100											

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR J. BLOCK
SOIL DESCRIPTIONS J. SMALL
ROCK DESCRIPTIONS J. SMALL
DISTRICT SOILS ENGR. J. CHRISTOPHER JS

SHEET 2 OF 3. HOLE NO. B-5

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MEGHANIGS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY TOMPKINS
[redacted]. PROJ. NO. E10300

HOLE NO. B-5
LINE & STA. SEE REMARKS for 2nd Location
OFFSET

PROJECT CAYUGA LAKE BASIN: SIXMILE CREEK DAMSITES (BETHEL GROVE)
QUAD. LOCATION ~~Trumansburg~~ DATE, START 22 SEP 71 SURF. ELEV. 719.9
SOIL SERIES DUNKIRK 75/A/L3 DATE, FINISH 12 OCT 71 DEPTH TO WATER -4.0 ft.
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4¼" I.D. 3¾" WEIGHT OF HAMMER 300 lbs HAMMER FALL
SAMPLER O.D. 2" I.D. 1½" INSIDE LENGTH OF SAMPLER 18" CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	GRID LOCATION, from USGS sheets: REMARKS N 872,290 E 534,245
100	No Casing Used	C-22	DRILLED				SHALE ROCK CORES	AX DIAMOND BIT 99.0' to 104.0'
						GR	60" REC. 29 pcs.	
105							Bottom of Hole at	104.0 ft.

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS J. Small
ROCK DESCRIPTIONS J. Small
DISTRICT SOILS ENGR. J. CHRISTOPHER JS

SHEET 3 OF 3. HOLE NO. B-5

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
B.S.M. PROJ. NO. 10300-701

HOLE NO. B-6
LINE & STA. N 878,725
OFFSET E 585,640

PROJECT CAYUGA LAKE BASIN - 6 MILE CREEK DAMSITE
QUAD. LOCATION 15/4/12 DATE, START 3-1-72 SURF. ELEV. 706.3
SOIL SERIES Dunkirk DATE, FINISH 3-6-72 DEPTH TO WATER -1.0'
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4.25 I.D. 3.75 | WEIGHT OF HAMMER 300 lbs. | HAMMER FALL CASING 18" SAMPLER 18"
SAMPLER O.D. 2.50 I.D. 3.00 | INSIDE LENGTH OF SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER (0/6 6/12 12/18 18/24)	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0	0							Note: Used 6" Roller Bit 0.0' to 9.0' - Then drove casing. ← G.W.
	0							
	0							
	0							
5	0							
	81							
	172							Drilled with "NX" Diamond Bit: Rec: 21" 7 pcs. 9.0' - 12.0'
	385 ↑							
10		C-1	Drilled			Gry	Shale	
								Drilled with "NX" Diamond Bit Rec: 24" 6 pcs. & chps.
15	Not Cased							
		C-2	Drilled			Gry	Shale	12.0' - 17.0'
20								
								Drilled with "NX" Diamond Bit: Rec: 96" 24 pcs.
25	↓	C-3	Drilled			Gry	Shale	17.0' - 26.0'
							Bottom of Hole @ 26.0'	

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS —
ROCK DESCRIPTIONS A. Franke
DISTRICT SOILS ENGR. J. Christopher A.

SHEET 1 OF 1. HOLE NO. B-6

ORIGINAL

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. E10300

HOLE NO. B-7
LINE & STA.
Coordinates: N879,265±
OFFSET E535,020±

PROJECT Cayuga Lake Basin - Six Mile Creek Dam Site (Bethel Grove)
QUAD. LOCATION 75-4-M18 DATE, START 24 Apr 72 SURF. ELEV. 824.9
SOIL SERIES Dunkirk DATE, FINISH 1 May 72 DEPTH TO WATER None Observed
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75" I.D. 2.25" | WEIGHT OF HAMMER 300 46 | HAMMER FALL CASING 18" SAMPLER 18"
SAMPLER O.D. 1.5" I.D. 1.0" | INSIDE LENGTH OF SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER (0/6 6/12 12/18 18/24)	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0	6							
	6							
	8							
	9							
	11							
5	9	J-1	2 3		M	Brn	SILT, trace Clay	5.0'-6.5'
	9		4					
	11							
	12							
	15							
10	16	J-2	5 10		M	Brn	SILT, trace Clay	10.0'-11.5'
	21		7					
	24							
	25							
	20							
15	21	J-3	6 4		W	Gry	SILT, Some Clay	15.0'-16.5'
	22		5					
	25							
	22							
	23							
20	33	J-4	8 8		W	Gry	SILT, Some Clay	20.0'-21.5'
	34		8					
	28							
	21							
	28							
25	35	J-5	1 1		W	Gry	SILT, Some Clay	25.0'-26.5'
	35		1					
	35							
	37							
	42							
30	33	J-6	1 2		W	Gry	SILT, Some Clay	30.0'-31.5'
	34		2					
	37							
	38							
	39							
35	29	J-7	WOH WOH		W	Gry	SILT, Some Clay	35.0'-36.5'
	27		2					
	35							
	35							
	37							
40	29	J-8	2 2		W	Gry	SILT, Some Clay	40.0'-41.5'
	34		2					
	37							
	50							
	45							
45	51	J-9	1 2		W	Gry	SILT, Some Clay	45.0'-46.5'
	57		2					
	59							
	68							
50	72							

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DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS D.B. Jenkins
ROCK DESCRIPTIONS —
DISTRICT SOILS ENGR. J.E. Christopher D.J.
SHEET 1 OF 2. HOLE NO. B-7

ORIGINAL

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 3
COUNTY Tompkins
[redacted]. PROJ. NO. E10300

HOLE NO. B-7
LINE & STA.
Coordinates: N877,265±
OFFSET E535,020±

PROJECT Cayuga Lake Basin - Six Mile Creek Dam Site (Bethel Grove)
QUAD. LOCATION 75-4-M18 DATE, START 24 Apr 72 SURF. ELEV. 824.9
SOIL SERIES Dunkirk DATE, FINISH 1 May 72 DEPTH TO WATER None Observed (ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 2.75" I.D. 2.25" | WEIGHT OF HAMMER 300 Lb | HAMMER FALL CASING 18" SAMPLER 18"
SAMPLER O.D. 1.5" I.D. 1.0" | INSIDE LENGTH OF SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
50	54	J-10	1	1				W	Gry	SILT, Some Clay, Trace Gravel and Sand	50.0'-51.5'
	61				1						
	66										
	81										
	82										
55	72	J-11	1	2				W	Gry	SILT, Some Clay, Trace Sand	55.0'-56.5'
	90				1						
	84										
	90										
	100										
60	82	J-12	2	2				W	Gry	SILT, Some Clay, Trace Gravel & Sand	60.0'-61.5'
	105				3						
	109										
	100										
	110										
65	112	J-13	1	2				W	Gry	SILT, Some Clay, Trace Gravel & Sand	65.0'-66.5'
	130				2						
	140										
	150										
	148										
70	147	J-14	2	2				W	Gry	SILT, Some Clay, Trace Sand	70.0'-71.5'
	140				2						
	164										
	161										
	167										
75	104	J-15	1	1				W	Gry	SILT, Some Clay, Trace Gravel & Sand	75.0'-76.5'
	125				2						
	126										
	130										
	148										
80	129	J-16	2	3				W	Gry	SILT, Some Clay	80.0'-81.5'
	235				2						
	375										Drilled W/AX Diamond Bit 84.0-85.0' Recovery = 6" 4 Pieces + Chips
	525										
	250	J-17							Gry	Boulder Cores	
85	330	J-18	31	39				W	Gry	SAND and Silt, Some Gravel	85.0'-86.5'
	390				48						
	1183										Drilled W/AX Diamond Bit 86.5-94.0' Recovery = 7" 8 Pieces
	3123										
90	1240										
	420										
	632										Drilled W/AX Diamond Bit 94.0-94.5' Recovery = 4" 3 Pieces + Chips
	Not Sampled	J-19							Gry	Boulder Cores	
95		J-20							Gry	Boulder Cores	
											Drilled W/AX Diamond Bit 94.5-97.0' No Recovery
										Bottom of Hole @ 97.0'	Note: WOH = Weight of Hammer.
100											

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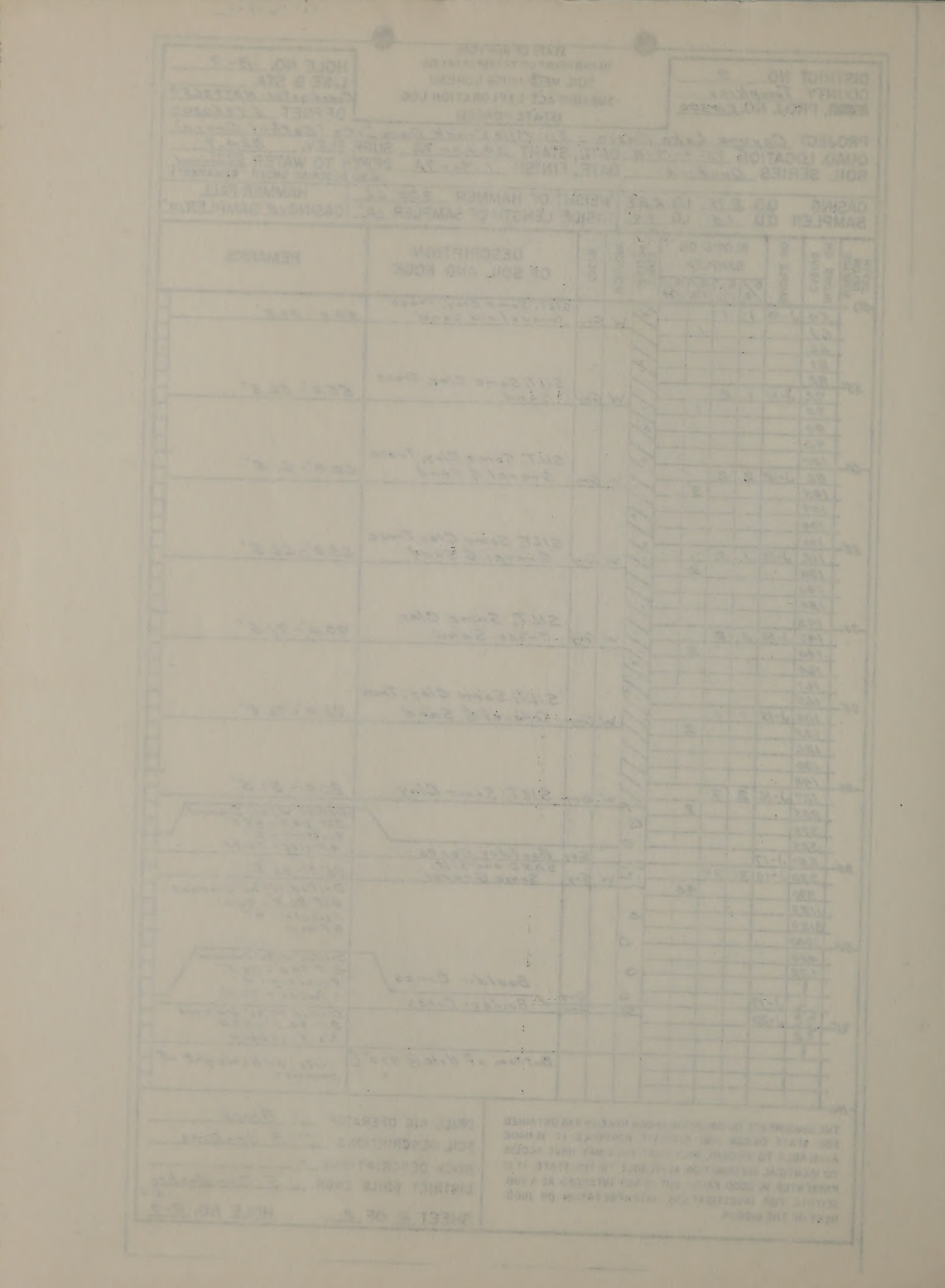
DRILL RIG OPERATOR J. Block
SOIL DESCRIPTIONS T S Jenkins
ROCK DESCRIPTIONS —
DISTRICT SOILS ENGR. J E Christopher D.J.

SHEET 2 OF 2. HOLE NO. B-7



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